



American-Lincoln Technology

OPERATOR'S MANUAL & PARTS LIST

ATS 46/53 BATTERY SWEEPER/SCRUBBER



Beginning with Serial Number: 683082

READ THIS BOOK

This book has important information for the use and safe operation of this machine. Failure to read this book prior to operating or attempting any service or maintenance procedure to your machine could result in injury to you or to other personnel. Damage to the machine or to other property could occur as well. You must have training in the operation of this machine before using it.

All directions given in this book are as seen from the operator's position at the rear of the machine.



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CLEANING PATH

Scrubbing	46 Inches (116.84 cm) or 53" (134.62cm)
Sweeping	60 Inches (152.40 cm)
Edge Cleaning	6 Inches (15.24 cm) Right Side 53 Inches (134.62 cm) Only

TRAVEL SPEED

0 - 4.7 MPH

STEERING

Rack & Pinion 90°-90° Hydraulic Power Steering
Adjustable Steering Column

TURNING RADIUS

Left	74.5 Inches (189.23 cm)
Right	74.5 Inches (189.23 cm)
Aisle "U" Turn	110.0 Inches (279.40 cm)

DIMENSIONS

Length	102.5 Inches (265.43 cm)
Width	55.0 Inches (132.08 cm)
Height	55.5 Inches (140.97 cm)
Height w/ Overhead Guard	78.75 Inches (197.49 cm)
Wheel Base	50.8 Inches (128.90 cm)

WEIGHT

Standard Machine	2600 lbs. (1170.0 Kg) Less Battery
------------------	------------------------------------

TIRES

Type	Urethane (Front & Rear)
Front	Two (2) 16" (41cm) x 3.75" (8.26 cm)
Rear	One (1) 16" (41 cm) x 4.00" (10.16 cm)

RAMP CLIMBING

Sweeping	3 Degrees
Transporting	8 Degrees

MAIN BROOM

One piece plastic core disposable type. Broom position can be set to "restricted down" or "free floating."

Length	45 Inches (114 cm)
Diameter	14 Inches (35.6 cm)
Bristle Length	3.25 Inches (8.26 cm)
Optional Bristle Type	Nylon (Herringbone) Proex and Wire High Density Nylon Poly and Wire

Main Broom Lift	Hard Linkage
Main Broom Arms	Patented (No-Tool Broom Change)

SIDE BROOM

Side Broom Size	21-inch (53.34 cm) Diameter
Side Broom Bracket	Swing Away Shock Mount
Side Broom Lift	Cable

INSTRUMENTS AND CONTROLS

Main Broom Lever (Activates Immediately when lowered)	
Key Switch	Combination Battery Condition & Hour Meter
Headlight/Taillight Switch	Side Broom Lever (Activates Immediately when lowered)
Squeegee Switch	Recovery High Light
Scrub Deck Switch	Clogged Filter Light (OPTION)
Hopper Temperature Light (OPTION)	Solution Control
Solution Low Light	Filter Shaker Switch
Hopper Up/Down	Dust Control Switch
Dump Door Open/Closed	Horn Button

SPECIFICATIONS

SCRUBBING SYSTEM

Brush Size-46"	Three (3) 16" (40.64 cm) Diameter Brushes
Brush Size-53"	Three (3) 17.88" (45.42 cm) Diameter Brushes
Brush Drive	Electric Motors, Off in Neutral (after 2-second delay)
Brush Drive Lift	Actuator
Scrub Load	Ground Clearance 250 lbs. (112.50 Kg) or 400 lbs. (180.0 Kg)

SQUEEGEE

Vacuum/Squeegee	55.5-inch (140.97 cm) Wide Swing, Gum Rubber Outer Blade
Side Squeegees (2)	Patented Configuration
Squeegee Lift	Actuator and Cable, Auto Lift in Reverse
Squeegee Hose	2-inch (5.08 cm) Diameter

TANKS

Solution Tank	70 Gallon (264.96 Liters) Polyethylene
Recovery Tank	70 Gallon (264.96 Liters) Polyethylene
Solution Metering	Variable to 3.0 GPM

HOPPER

Capacity	10 Cubic Feet (.2832 Cubic Meters), 700 lbs. (315 Kg)
Dump and Lift	Variable Dump with Dump Door
Filter	78 Sq. Ft. (72,464 Sq. Cm)
Dump Height	60 Inches (152.40 cm)
Reach Into Dumpster	11 Inches (27.94 cm)

SYSTEM FLUID CAPACITIES

Fuel Tank	10.0 Gallons (37.95 Liters)
Hydraulic System	4.0 Gallons (15.16 Liters)

OPTIONAL EQUIPMENT

Seat Belt	Back Up Alarm	Clogged Filter
Wet Sweep Bypass/Thermo-Sensor	Work Light	Roll-Out Battery
Amber Safety Light	Headlight/Taillight Switch	Fire Extinguisher
ESP & Autofil Recycling System	Overhead Guard	Vacuum Wand
Pad Drivers	Non-Marking Tires	Spray Wand
Scrub Brushes		

WARRANTY

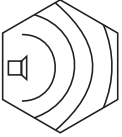
Our general conditions of business are applicable with regard to the guarantee. Subject to change as a result of technical advances. The guarantee is invalidated if the machine is not operated in accordance with these instructions or otherwise abused. The guarantee is invalidated if the machine is not serviced as described.

MACHINE DATA

ALTO®

MODEL

WEIGHT



MACHINE NAME

DATE / SERIAL NUMBER

RATED POWER

MAX OPERATING SLOPE

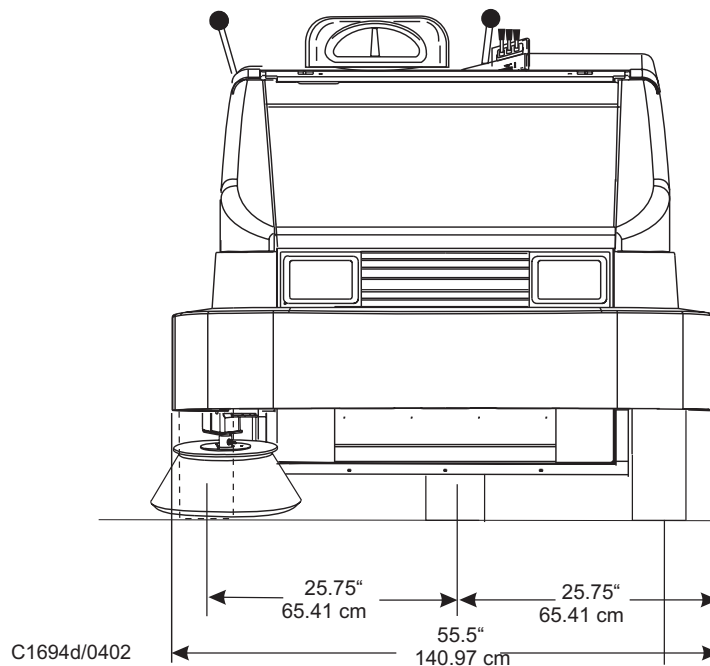
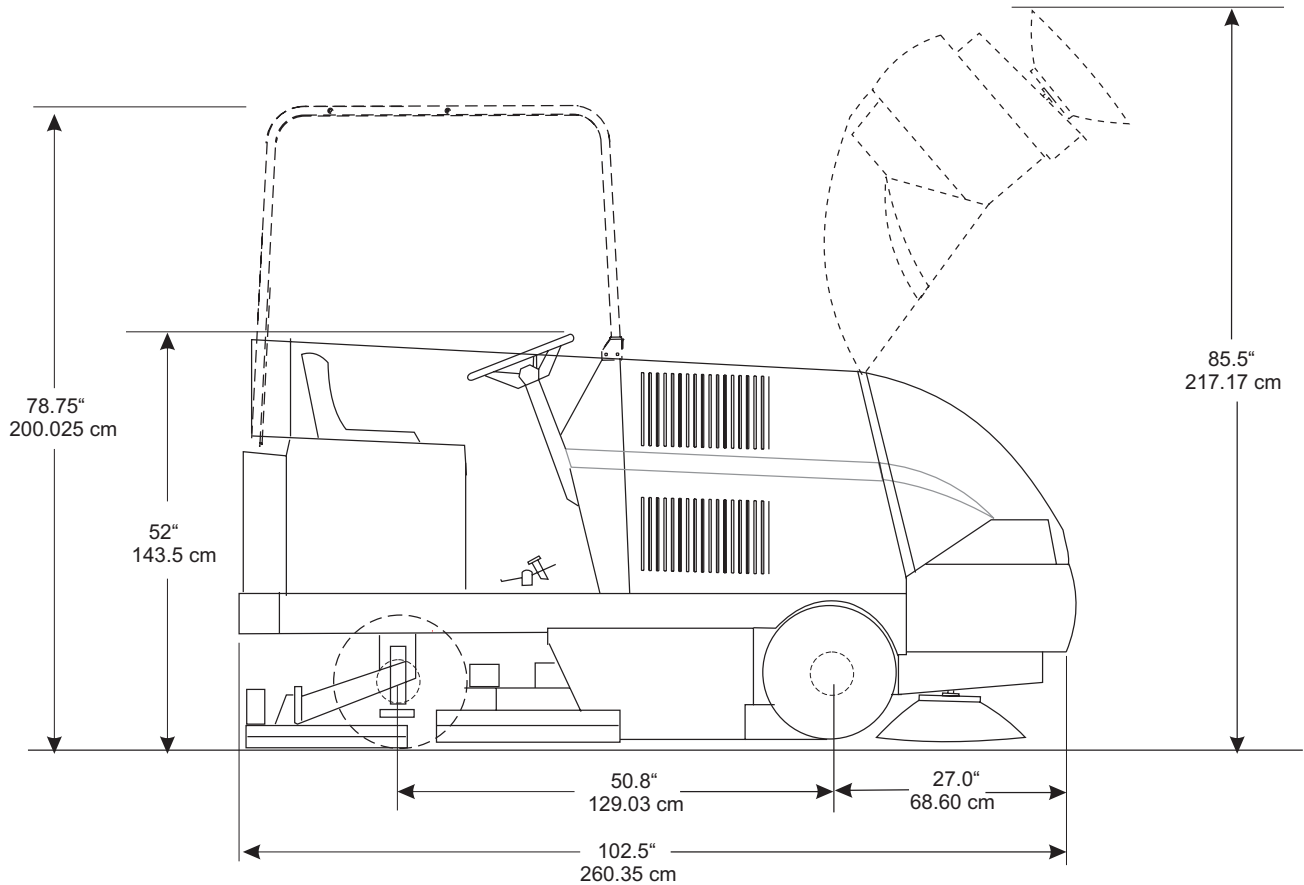
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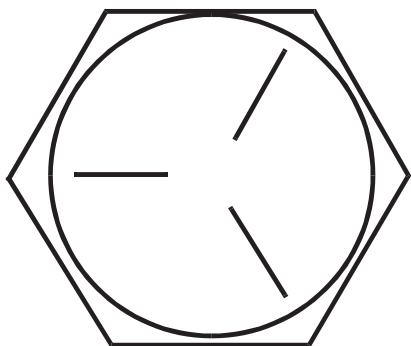
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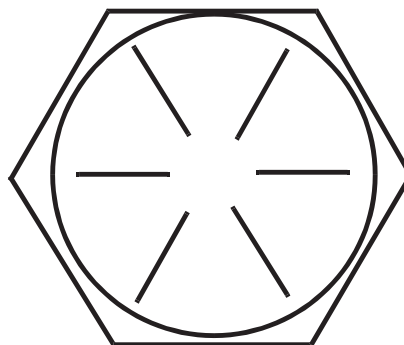
MACHINE DIMENSIONS



BOLT IDENTIFICATION



SAE - Grade 5



SAE - Grade 8

Screw Size	Grade 5 Plated		Grade 8 Plated		410H Stainless		Brass	Type F & T & BT		Type B, AB
	C	F	C	F	C	F		C	F	
*6	14	15	-	-	18	20	5	20	23	21
*8	27	28	-	-	33	35	9	37	41	34
*10	39	43	-	-	47	54	13	49	64	49
*1/4	86	108	130	151	114	132	32	120	156	120
5/16	15	17	22	24	19	22	6	-	-	-
3/8	28	31	40	44	34	39	10	-	-	-
7/16	44	49	63	70	55	62	16	-	-	-
1/2	68	76	95	108	85	95	-	-	-	-
9/16	98	110	138	155	-	-	-	-	-	-
5/8	135	153	191	216	-	-	-	-	-	-
3/4	239	267	338	378	-	-	-	-	-	-
7/8	387	-	545	-	-	-	-	-	-	-
1	579	-	818	-	-	-	-	-	-	-
C = Coarse Thread F = Fine Thread * = Torque values for #6 through 1/4 are lb./in. All others are lb./ft.										
NOTE Decrease the torque by 20% when using thread lubricant The torque tolerance is \pm on torque values.										+

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HYDRAULIC TORQUE REQUIREMENTS

HYDRAULIC TORQUE REQUIREMENTS

Refer to the following chart for torque values on all hydraulic hoses and fittings.

Nominal SAE Dash Size	O-Ring Face Seal End		SAE O-Ring Boss End	
	Thread Size Inch	Swivel Nut Torque	Thread Size Inch	Str. Fitting or Locknut Torque
		LB-FT		LB-FT
-3	*	*	3/8-24	8-10
-4	9/16-18	10-12	7-16-20	14-16
-5	*	*	1/2-20	18-20
-6	11/16-16	18-20	9/16-18	24-25
-8	13/16-16	32-35	3/4-16	50-60
-10	1-14	46-50	7/8-14	72-80
-12	1 3/16-12	65-70	1 1/16-12	125-135
-14	1 3/16-12	65-70	1 3/16-12	160-180
-16	1 7/16-12	92-100	1 5/16-12	200-220
-20	1 11/16-12	125-140	1 5/8-12	210-280
-24	2-12	150-165	1 7/8-12	270-360
* O-Ring face seal type end not defined for this tube size.				
NOTE				
Parts must be lightly oiled with hydraulic fluid.				

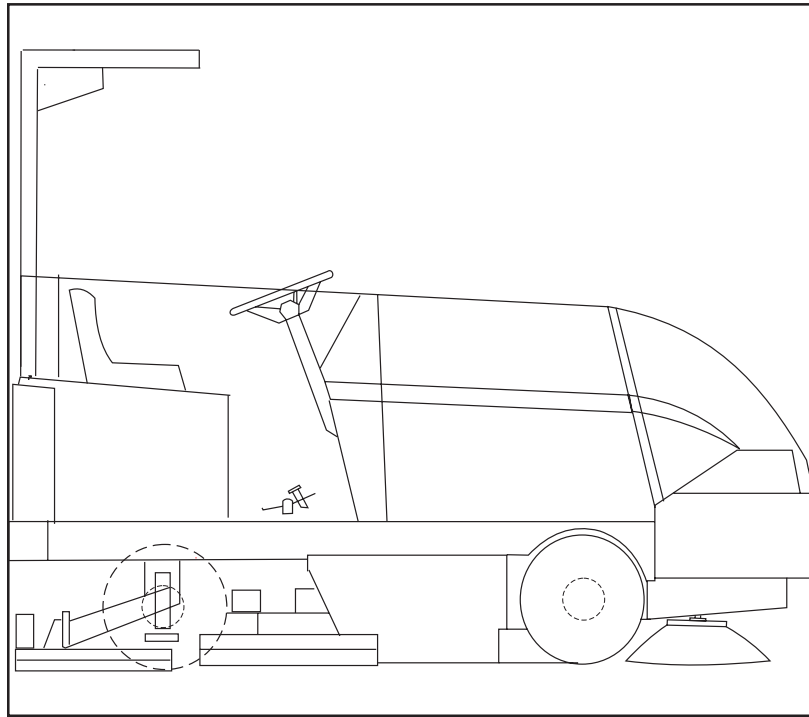
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DECIMAL-METRIC CONVERSION TABLE

DECIMAL-METRIC CONVERSION TABLE

Fraction	Decimal	Millimeter	Fraction	Decimal	Millimeter
$\frac{1}{64}$	0.015625	0.3969	$\frac{33}{64}$	0.515625	13.0969
$\frac{1}{32}$	0.03125	0.7938	$\frac{17}{32}$	0.53125	13.4938
$\frac{3}{64}$	0.046875	1.1906	$\frac{35}{64}$	0.546875	13.8906
$\frac{1}{16}$	0.0625	1.5875	$\frac{9}{16}$	0.5625	14.2875
$\frac{5}{64}$	0.078125	1.9844	$\frac{37}{64}$	0.578125	14.6844
$\frac{3}{32}$	0.09375	2.3813	$\frac{19}{32}$	0.59375	15.0813
$\frac{7}{64}$	0.109375	2.7781	$\frac{39}{64}$	0.609375	15.4781
$\frac{1}{8}$	0.125	3.1750	$\frac{5}{8}$	0.625	15.8750
$\frac{9}{64}$	0.140625	3.5719	$\frac{41}{64}$	0.640625	16.2719
$\frac{5}{32}$	0.15625	3.9688	$\frac{21}{32}$	0.65625	16.6688
$\frac{11}{64}$	0.171875	4.3656	$\frac{43}{64}$	0.671875	17.0656
$\frac{3}{16}$	0.1875	4.7625	$\frac{11}{16}$	0.6875	17.4625
$\frac{13}{64}$	0.203125	5.1594	$\frac{45}{64}$	0.703125	17.8594
$\frac{7}{32}$	0.21875	5.5563	$\frac{23}{32}$	0.71875	18.2563
$\frac{15}{64}$	0.234375	5.9531	$\frac{47}{64}$	0.734375	18.6531
$\frac{1}{4}$	0.25	6.3500	$\frac{3}{4}$	0.75	19.0500
$\frac{17}{64}$	0.265625	6.7469	$\frac{49}{64}$	0.765625	19.4469
$\frac{9}{32}$	0.28125	7.1438	$\frac{25}{32}$	0.78125	19.8438
$\frac{19}{64}$	0.296875	7.5406	$\frac{51}{64}$	0.796875	20.2406
$\frac{5}{16}$	0.3125	7.9375	$\frac{13}{16}$	0.8125	20.6375
$\frac{21}{64}$	0.328125	8.3344	$\frac{53}{64}$	0.828125	21.0344
$\frac{11}{32}$	0.34375	8.7313	$\frac{27}{32}$	0.84375	21.4313
$\frac{23}{64}$	0.359375	9.1281	$\frac{55}{64}$	0.859375	21.8281
$\frac{3}{8}$	0.375	9.5250	$\frac{7}{8}$	0.875	22.2250
$\frac{25}{64}$	0.390625	9.9219	$\frac{57}{64}$	0.890625	22.6219
$\frac{13}{32}$	0.40625	10.3188	$\frac{29}{32}$	0.90625	23.0188
$\frac{27}{64}$	0.421875	10.7156	$\frac{59}{64}$	0.921875	23.4156
$\frac{7}{16}$	0.4375	11.1125	$\frac{15}{16}$	0.9375	23.8125
$\frac{29}{64}$	0.453125	11.5094	$\frac{61}{64}$	0.953125	24.2094
$\frac{15}{32}$	0.46875	11.9063	$\frac{31}{32}$	0.96875	24.6063
$\frac{31}{64}$	0.484375	12.3031	$\frac{63}{64}$	0.984375	25.0031
$\frac{1}{2}$	0.5	12.7000	1	1.0000	25.4000

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FIGURE 1

YOUR ATS 46/53 BATTERY MACHINE HAS BEEN SHIPPED COMPLETE, BUT DO NOT ATTEMPT TO OPERATE WITHOUT FOLLOWING THESE INSTRUCTIONS.

PREPARING THE MACHINE FOR OPERATION

- *Uncrate the machine and carefully remove from skid to prevent damage.
- *The ATS 46/53 machines that are shipped without batteries have the (+) positive drive motor lead disconnected.
- *Open the battery compartment and connect the (+) positive motor lead to the top terminal post (the wire "P" is also attached to it). Tighten the terminal nut.
- *Install the scrub brushes.
- *Check the oil level in the hydraulic reservoir
- *Install batteries as follows (if not included):
 1. Turn the key to the "OFF" position.
 2. Raise the Solution Cover to the open position.
 3. Use a battery lifting device with a 2500 lbs. (1150 Kg) capacity hoist to lift the battery.
 4. Using the lifting device, lower the 36 volt battery into the battery compartment directly in front of the driver's compartment. Orient the cables & plug them in as required.
 5. Plug the polarized connector from the battery into the 36-volt plug provided.

**WARNING**

Hydrogen gas is formed during the charging operation and is explosive! Only charge batteries in a well-ventilated area with the lid open. Avoid any open flame or electrical sparks. Pulling out the charger plug with the timer on will cause an arc and must be avoided.

SAFETY INSTRUCTIONS

THE FOLLOWING STATEMENTS ARE USED THROUGHOUT THIS MANUAL AS INDICATED IN THEIR DESCRIPTIONS:



DANGER

To warn of immediate hazards which will result in severe personal injury or death.



WARNING

To warn of hazards or unsafe practices which could result in severe personal injury or death.



CAUTION

To warn of hazards or unsafe practices which could result in minor personal injury.



ATTENTION

To warn of unsafe practices which could result in extensive equipment damage.

NOTE

To give important information or to warn of unsafe practices which could result in equipment damage.



WARNING

THE FOLLOWING INFORMATION SIGNALS POTENTIALLY DANGEROUS CONDITIONS TO THE OPERATOR OR EQUIPMENT. READ THIS MANUAL CAREFULLY. KNOW WHEN THESE CONDITIONS CAN EXIST. THEN, TAKE NECESSARY STEPS TO TRAIN MACHINE OPERATING PERSONNEL. FOR THE SAFE OPERATION OF THIS MACHINE, READ AND UNDERSTAND ALL WARNINGS, CAUTIONS AND NOTES.



WARNING

Machines can ignite flammable materials and vapors. Do not use with or near flammables such as gasoline, grain dust, solvents, and thinners.



WARNING

Heavy machinery. Improper use can cause personal injury.



WARNING

Operate only when lids, doors, and access panels are securely closed.



WARNING

Use care when reversing machine in confined area.



WARNING

When servicing the machine, disconnect the batteries first to prevent possible injury.



WARNING

When working on the machine, empty hopper, remove batteries, clear area of people and obstructions, use additional people and proper procedures when lifting the machine.



WARNING

Always empty the hopper and disconnect the battery before doing maintenance.



WARNING

You must have training in the operation of this machine before using it.
READ THE INSTRUCTION BOOK.



WARNING

Do not operate this machine unless it is completely assembled.



WARNING

Do not use this machine as a step or furniture.



WARNING

Stop and leave this machine on a level surface. When you stop the machine, put the power switch in the “OFF” position and engage the Wheel Lock.



WARNING

To prevent injury and damage to the machine, do not lift the machine or move it to an edge of a stair or loading dock.



WARNING

Lead acid batteries generate gases, which can cause an explosion. Keep sparks and flames away from batteries. **NO SMOKING.** Charge batteries only in areas with good ventilation.



WARNING

Always wear eye protection and protective clothing when working near batteries. Remove all jewelry. Do not put tools or other metal objects across the battery terminals or across the tops of batteries.



WARNING

Only authorized personnel should do maintenance and repairs. Tighten all fasteners. Maintain adjustments according to the specifications given in the service manual for the machine. Keep the electrical parts of the machine dry. For storage, keep the machine in a building.



WARNING

Make sure all labels, decals, warnings, cautions and instructions are fastened to the machine. Purchase new labels and decals from American-Lincoln.



WARNING

The operator must exhibit extreme caution when negotiating, turning, and traveling across grades or ramps. Start, stop, change direction, travel and brake smoothly. Slow down when turning.



WARNING

Avoid uneven surfaces and loose materials. Watch for obstructions, especially overhead.



WARNING

Operate only from the designated operator’s position. Stay inside the body of the machine. Keep hands and feet on the designated controls. Always operate in well-lighted areas.



WARNING

Do not carry passengers on the machine. Set the Wheel Lock when leaving the machine. Chock (block) the wheels if the machine is parked on a grade (ramp), or is being prepared for maintenance.



WARNING

Never leave the operator’s compartment when the machine is running.



WARNING

Report damage or faulty operation immediately. Do not operate the machine until repairs have been completed. Only authorized personnel should do maintenance and repairs.



WARNING

To maintain the stability of this machine in normal operation, the overhead guard, counterweights, rear bumper guard, or any similar equipment installed by the manufacturer, as original equipment should never be removed. If it becomes necessary to remove such equipment for repair or maintenance, this equipment must be reinstalled before the machine is placed back into operation.



WARNING

Electrical hazard. Shocks can cause serious personal injury. Unplug the battery before cleaning or servicing. To avoid possible injury or property damage, read the Operator’s Manual before servicing the machine. Authorized personnel should do maintenance and repairs.

SAFETY INSTRUCTIONS



WARNING

Disconnecting the battery connector with the key switch in the “I” position will cause sparks that could ignite explosive hydrogen gas generated by the batteries. To prevent serious injury or possible property damage, turn Key Switch to “O” position before disconnecting the battery cable from the machine for charging or service.

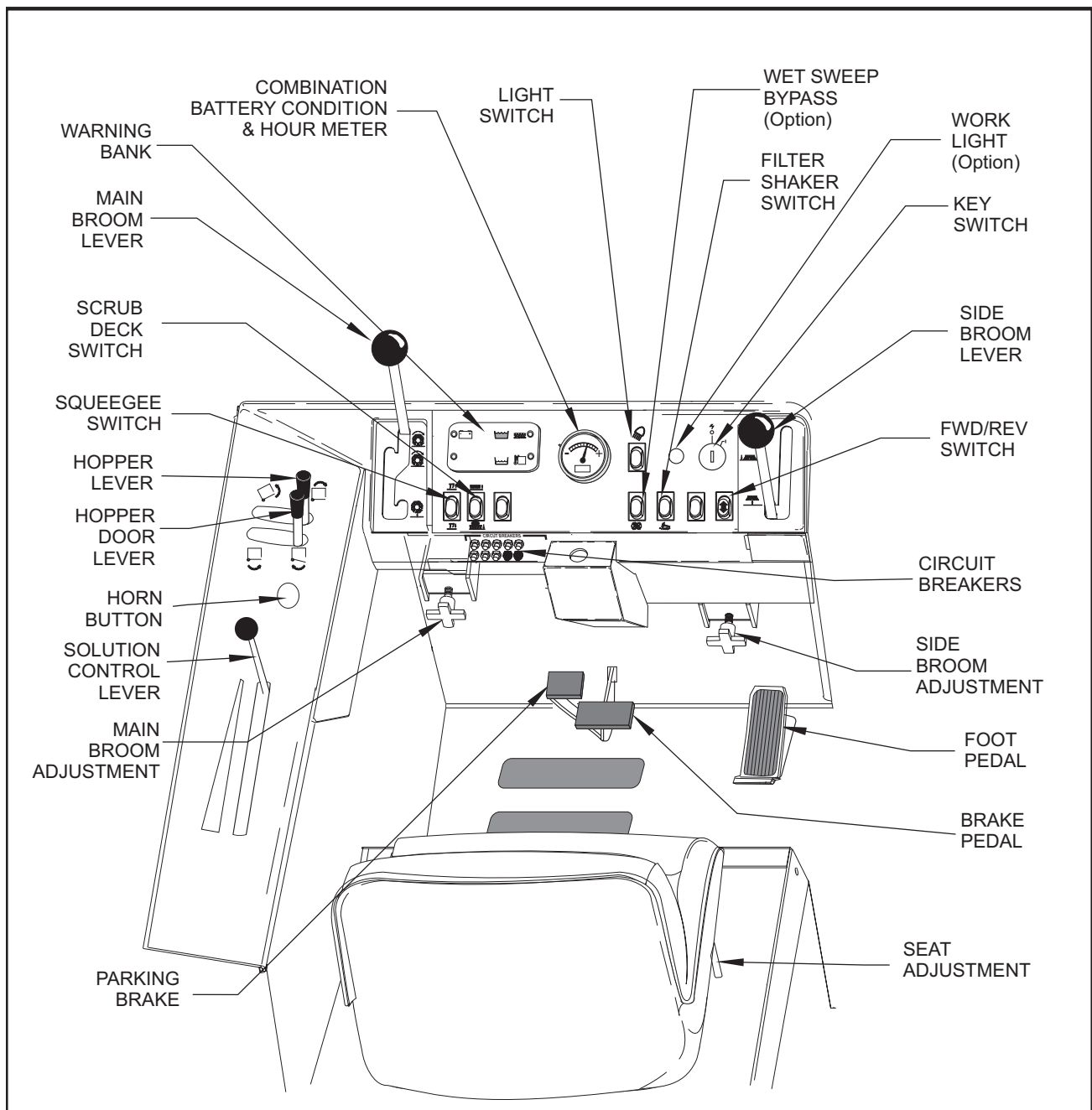
FOR SAFETY, OBSERVE THE FOLLOWING WARNINGS. FAILURE TO COMPLY MAY CREATE A SERIOUS RISK OF INJURY TO YOU AND OTHERS. THIS MACHINE SHOULD NOT BE USED IN HAZARDOUS LOCATIONS INCLUDING AREAS OF VOLATILE DUST OR VAPOR CONCENTRATIONS.

Operators must be trained and qualified to operate this machine. They must also understand the operator’s manual before starting.

Use caution when mounting or dismounting the machine, particularly on wet/slippery surfaces.

Do not dump the hopper over an open pit or dock. Do not dump the hopper when positioned on a grade (ramp). The machine must be level (horizontal).

OPERATION OF CONTROLS AND GAUGES



P5034b-1batt

FIGURE 2

LIGHT SWITCH (See Figure 2)

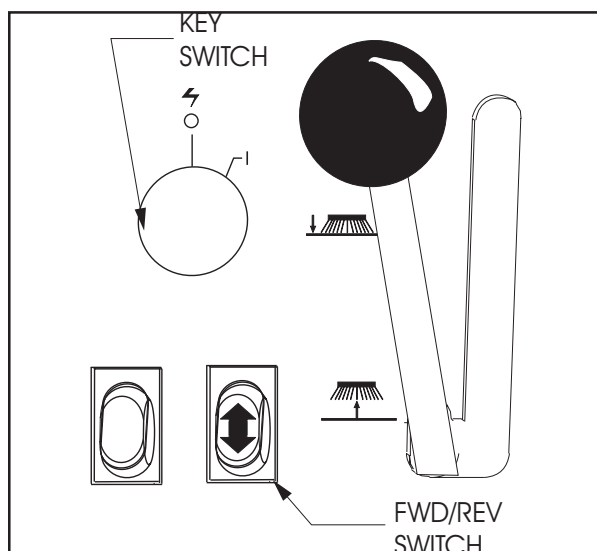
The light switch is located on the instrument panel to the right of the battery condition/hour meter. It will work various light options available for this machine, such as:

- * HEAD LIGHTS
- * TAIL LIGHTS
- * INSTRUMENT LIGHTS

HORN BUTTON (See Figure 2)

The horn button is located on the left side control panel. Push the button to sound the horn. The horn button is always active.

OPERATION OF CONTROLS AND GAUGES



C1631A-batt FIGURE 3

KEY SWITCH (See Figure 3)

The keyed ignition switch is located on the instrument panel to the left of the side broom lever. The key switch is a two-position switch that controls power to the machine systems and accessories. The “OFF” position (O position) will shut off the machine. The IGN/ON position (I position) provides power to the machine and all its systems and accessories.

NOTE

The operator should never leave the machine unattended while it is on.

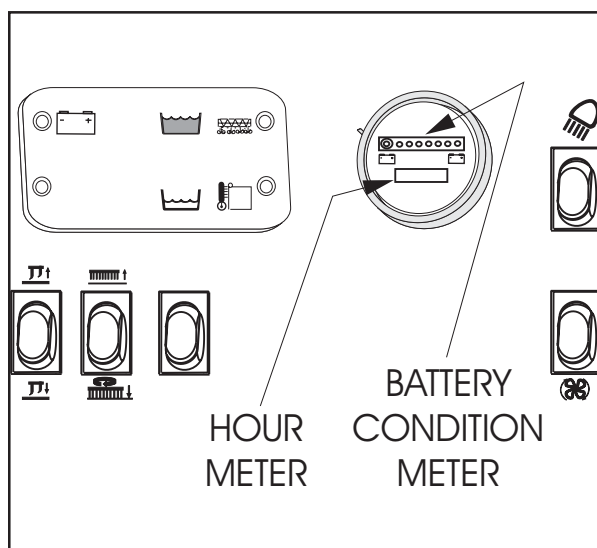
FORWARD/REVERSE SWITCH (See Figure 3)

A two-position switch controls the machine’s direction and is located on the righthand side of the instrument panel directly below the key switch. Pushing the upper portion of the switch will provide forward motion when the foot pedal is pressed. Pushing the bottom portion of the switch will make the machine move in reverse when the foot pedal is pressed.

NOTE

The machine will not move if:

The operator is not seated properly in the operator’s compartment due to the Seat Switch Interlock safety feature; or if the foot pedal is depressed or depressed too quickly after turning the key switch on as a result of the High Pedal Disable safety feature. (See “Millipak SEM Controller”)



C1633-batt FIGURE 4

COMBINATION BATTERY CONDITION & HOUR METER (See Figure 4)

The combination battery condition and hour meter is located on the instrument panel next to the warning bank. The meter is activated when the key switch is placed in the ignition position. The hour meter indicates the actual “run” time of the machine and can be used to determine machine maintenance intervals.

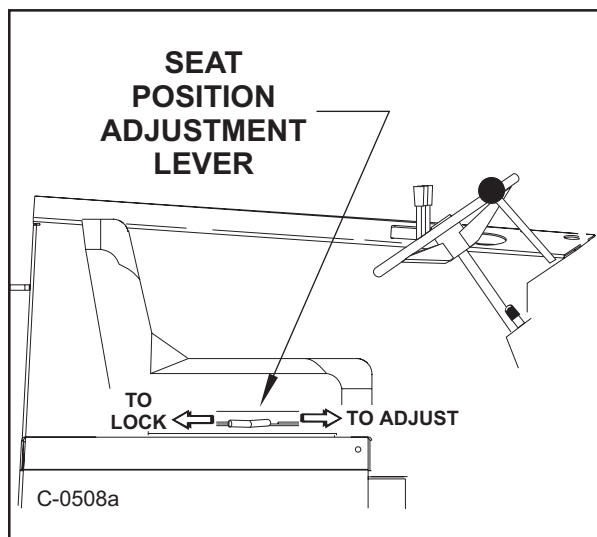
The battery condition meter indicates the charge level of the batteries. The batteries are sufficiently charged if all the amber LEDs are illuminated during the machine’s operation.

If the LED on the far left displays red while using the machine, the low voltage lockout safety feature will shut down the scrub deck’s operation. The batteries must now be **fully** charged in order to reset the low voltage lockout and continue the cleaning operation.

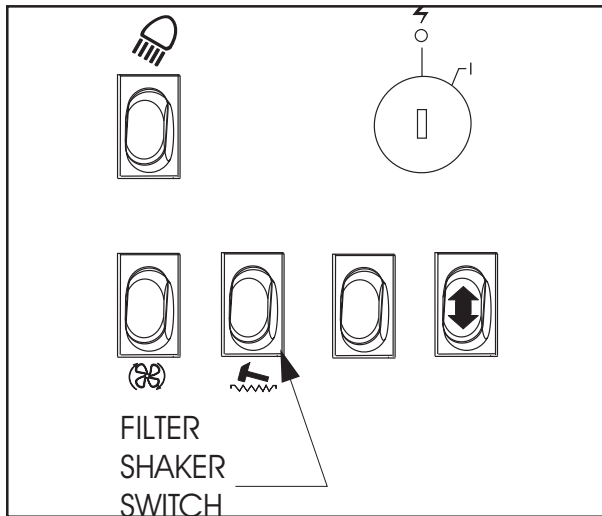
SEAT POSITION ADJUSTMENT (See Figure 5)

The seat position adjustment lever is located on the right side of the seat base. The lever is spring loaded to the “LOCK” position.

To adjust the seat, push “FORWARD” on the lever and move the seat to the desired position. Then release the lever to “LOCK” the seat into place.



C0508A-2 FIGURE 5



C1640-2batt FIGURE 6

FILTER SHAKER SWITCH (See Figure 6)

The filter shaker switch is located on the instrument panel below the ignition switch. This is a momentary switch that will activate the filter shaker motors for 20 to 30 seconds to clear the dust control filter. The Impeller fan will stop when the filter shaker has been activated. The filter shaker will only operate with the hopper in the "DOWN" position.

Use the filter shaker to clear the filter when the dust control light comes on (warning bank) and just before dumping the hopper.

MillipaK SEM CONTROLLER (See Figure 7)

The controller is located in the seat compartment and includes a number of features designed to help the user track down operational faults, wiring faults or internal controller faults, including a flashing indicator light.

The Flash Codes are:

ON	No fault, normal condition
OFF	Internal controller fault
1 flash	Program Error
2 flashes	High Pedal Disable
3 flashes	MOSFET Short Circuit
4 flashes	Contact fault or Motor Open Circuit
5 flashes	Not used
6 flashes	Accelerator wire off fault
7 flashes	Low or High battery voltage
8 flashes	Over temperature or timed cutback

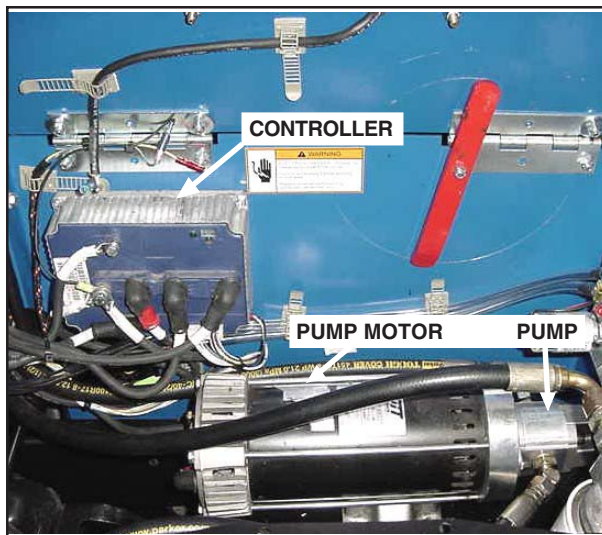
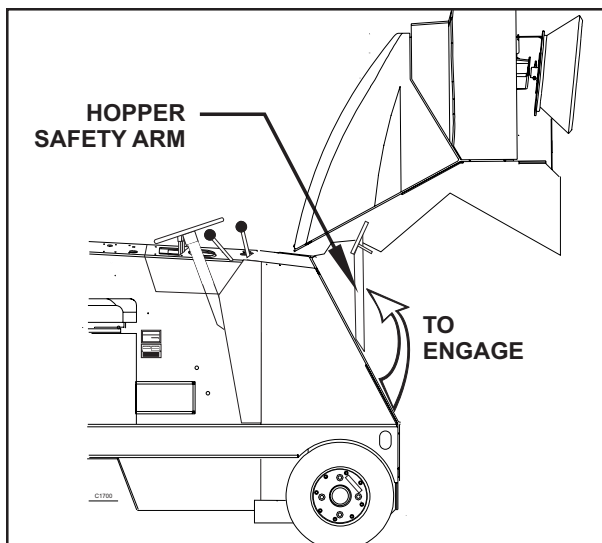


FIGURE 7

HYDRAULIC PUMP (See Figure 7)

The pump is located in the seat compartment and is powered by a 45 amp circuit breaker (on the power panel) and a contact linked with the key switch. It functions at 1450 PSI and features 100 bar relief.



C1700 FIGURE 8

HOPPER SAFETY LOCK ARM (See Figure 8)

The hopper safety arm is located near the right front wheel well. The safety arm will prevent the hopper from dropping unexpectedly during service/maintenance.

TO ENGAGE THE SAFETY ARM:

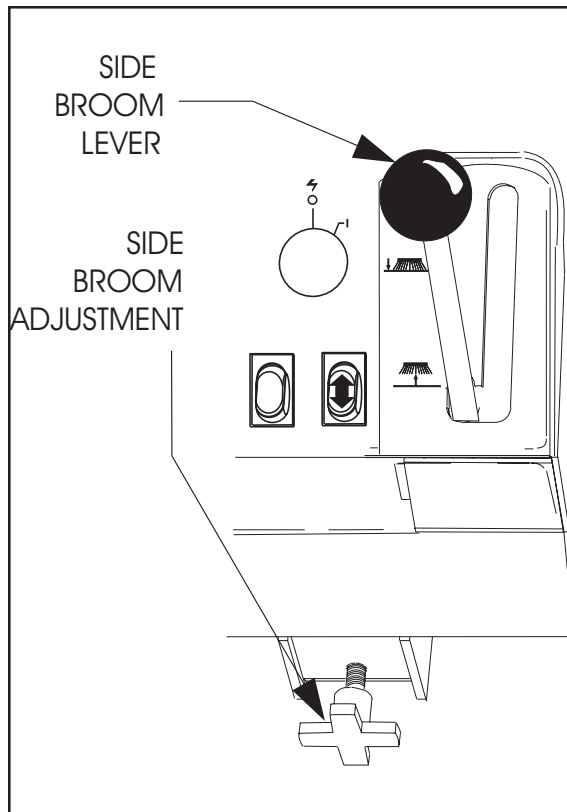
1. Empty hopper
2. Set the parking brake.
3. Raise the hopper.
4. Lift safety arm to engage the slot on the hopper frame.
5. When work has been completed, return the safety arm to the stowed position.



WARNING

When the hopper is raised the safety arm must be engaged before ANY work is done under the hopper.

OPERATION OF CONTROLS AND GAUGES



C1641batt FIGURE 9

SIDE BROOM LEVER (See Figure 9)

The Side Broom Lever is located to the right of the instrument console. The handle pulled back and turned to the left, will raise the side broom and lock it into position.

To raise the side broom pull the lever back into the “UP” position.

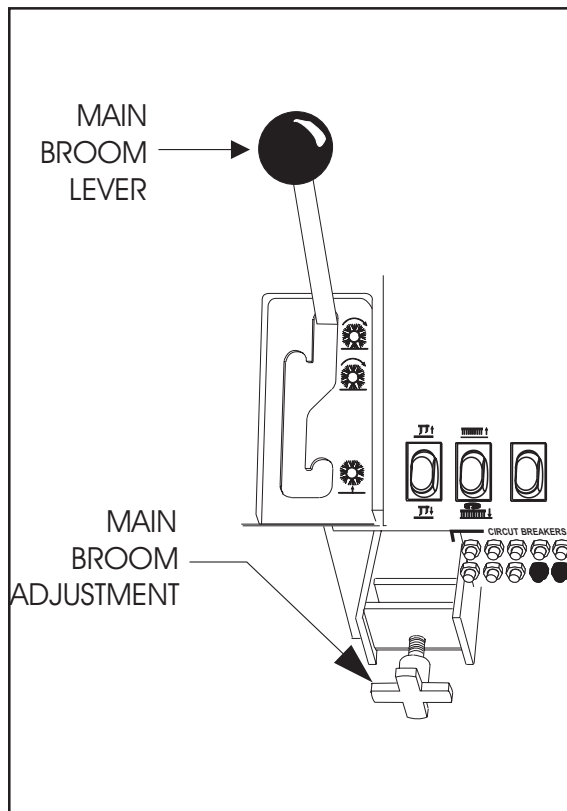
To lower the side broom, move the lever out of the “UP” position and move it forward to the “DOWN” position.

NOTE

IF THE MAIN BROOM IS ENGAGED, THE SIDE BROOM WILL AUTOMATICALLY ENGAGE WHEN LOWERED.

SIDE BROOM ADJUSTMENT (See figure 9)

The side broom lever has an adjustment for changing the sweep height to compensate for broom wear. The side broom adjustment is located under the right side of the instrument panel.



C1642-1batt FIGURE 10

MAIN BROOM LEVER (See figure 10)

The main broom lever is located on the left side of the instrument panel. The main broom lever has three positions and controls the main broom sweep height.

To lower the main broom, grasp the lever and move it to the left out of the “UP” position, and place it in the “SWEEP” or “FLOAT” position.

The “SWEEP” position is used for normal sweeping and should be used under most sweeping conditions (approximately 2” broom pattern).

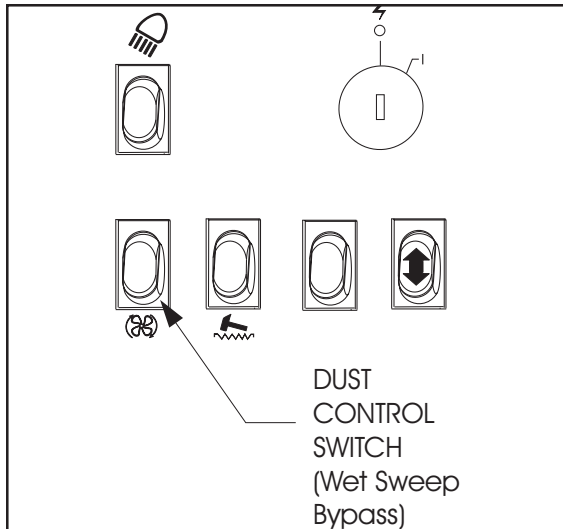
The “FLOAT” position is used for sweeping very uneven surfaces only. Using the float position will cause premature wear on the main broom if used under normal operating conditions for extended periods of time (approximately 4” broom pattern).

NOTE

The Main Broom will automatically engage when lowered to the sweep position or the float position. The hopper must be completely closed.

MAIN BROOM ADJUSTMENT (See Figure 10)

The main broom lever has an adjustment for changing the sweep height to compensate for broom wear. The main broom adjustment is located under the left side of the instrument panel.

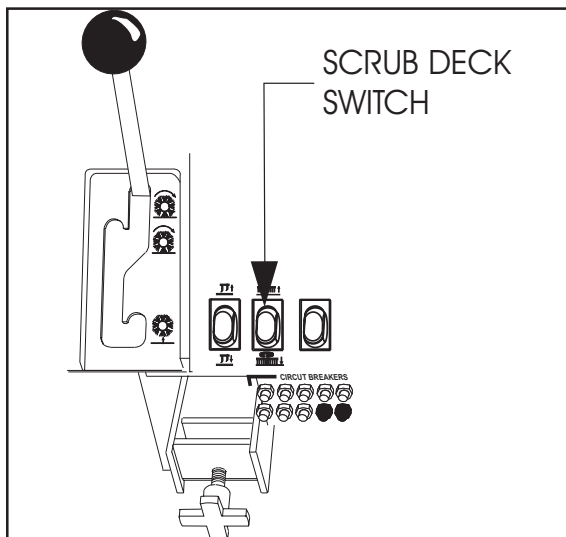


C1640-1batt FIGURE 11

DUST CONTROL SWITCH (See Figure 11)

The Dust Control Switch is a two position switch located on the instrument panel next to the filter shaker switch. The switch controls the vacuum fan in the dust control system.

To turn on the dust control system for “NORMAL” sweeping, press on the top portion of the switch. To turn off the dust control system for sweeping in wet conditions, press the lower portion of the switch. This will prevent the filter from being damaged by water pickup while sweeping.



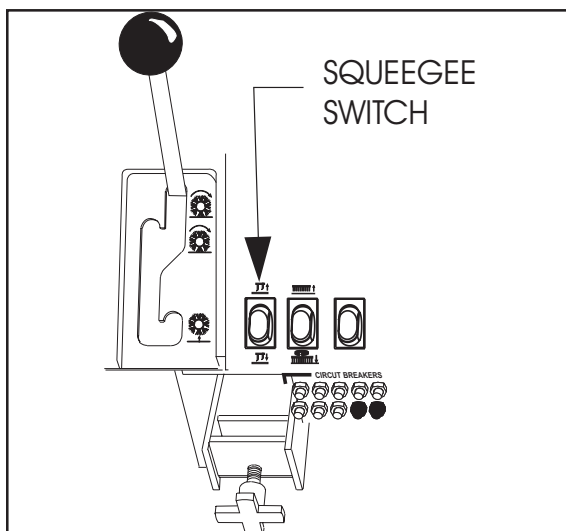
C1642A-batt FIGURE 12

SCRUB DECK SWITCH (See Figure 12)

The brushes switch is located on the console to the left of the steering wheel in the “SCRUBBING” section. This switch in the position marked “LOWER” will lower the scrub deck and activate the three scrub brushes. This switch in the “RAISE” position will stop the brushes from rotating and raise the scrub deck.

NOTE

Lowering the scrub deck will not start the brushes rotating. The machine must be moving to engage the scrub brushes. If the machine stops moving for 2 seconds or more, the brushes will automatically stop rotating until the machine starts moving again.



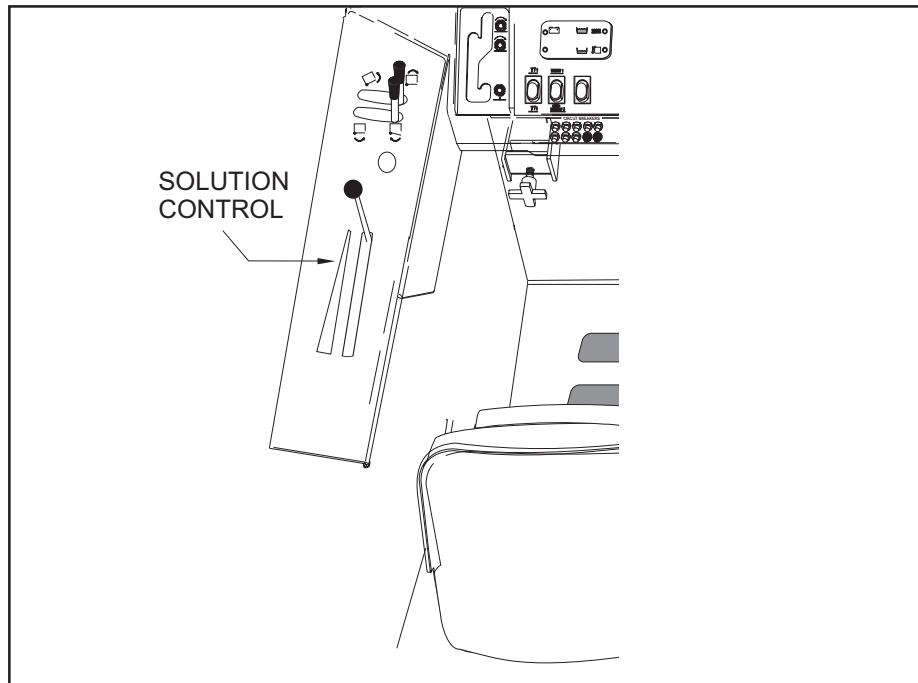
C1642B-batt FIGURE 13

SQUEEGEE SWITCH (See Figure 13)

The squeegee blade switch is located on the console to the left of the steering wheel in the “SCRUBBING” section. This switch in the position marked “LOWER” will lower the squeegee and activate the squeegee vacuum. This switch in the “RAISE” position will stop the squeegee vacuum and raise the squeegee. If the machine is put in reverse, a switch is automatically activated to raise the squeegee if in the lowered position as well as stop the vacuum.

The switch has a center position which will raise the squeegee but allows the vacuum to continue running, retrieving the water left in the squeegee recovery hose. This prevents water from dripping on the floor with the squeegee “UP.”

OPERATION OF CONTROLS AND GAUGES



C1716batt

FIGURE 14

SOLUTION CONTROL (See Figure 14)

To apply solution to the scrub brushes, pull the solution control lever back until the desired setting is reached. The solution rate is continuously variable from off to approximately 1-3/4 GPM at low and 3 GPM at high. To stop application of solution push forward on the lever until it stops at the “off” position. The solution warning light will illuminate when the solution tank is low, marking the end of the scrubbing cycle.

NOTE

For best results, discontinue application of solution 10 feet before stopping or making a 90° or 180° turn.

NON-RECYCLING OR STANDARD SCRUBBING SYSTEM

1. Make sure the solution control lever is in the “off” (FORWARD) position.
2. Open the solution tank cover (Vacuum Assembly)
3. Fill the tank with 70 gallons of water and the correct mixture of American-Lincoln #100 Industrial Cleaner for the job on hand.
4. Close the solution tank cover (Vacuum Assembly).

RECYCLING OR ESP & AUTOFIL SYSTEM

1. Make sure the solution control lever is in the “off” position.
2. Connect hose to autofil coupling.
3. Turn the key switch to the “ACC” position.
4. Turn on the water hose valve.
5. Fill the detergent tank with American-Lincoln #100 Industrial Cleaner.
6. The system will fill the solution and recovery tank to proper levels and shut off the water flow.

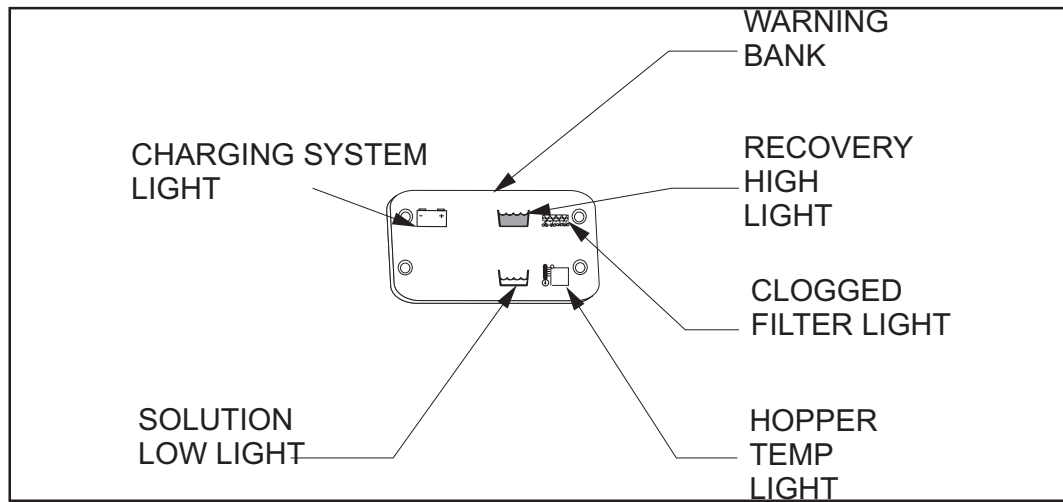
TO DISCONNECT WATER HOSE

1. Leave ignition switch in the “on” position
2. Turn the water off at the source
3. “Tip” the float switch on the solution tank to depressurize the water hose before disconnecting



WARNING

To prevent oversudsing and machine damage, use only AMERICAN-LINCOLN Industrial Cleaner Solution #100. DO NOT put gasoline, combustible or flammable material in the solution, detergent, or recovery tanks.

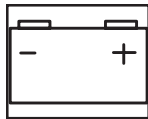


C1636batt

FIGURE 15

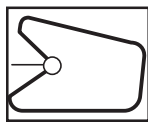
WARNING BANK (See Figure 15)

The Warning Bank is located on the instrument panel and provides the operator with fault/status indicators for engine and sweeper systems. The operator should monitor the indicators while sweeping. It is very important that the operator be familiar with the meaning of each indicator.



CHARGING SYSTEM LIGHT

The charging system light illuminates to indicate a charging system fault. When this occurs the machine's charging system is not working properly, have the machine serviced by a qualified service technician.



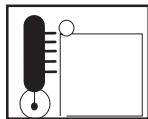
CLOGGED FILTER LIGHT (Option)

The clogged filter light illuminates to indicate that the dust control filter is clogged. When this occurs, stop the machine and use the filter shaker to clear the dirt and debris from the filter. After using the filter shaker, continue sweeping.



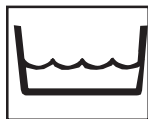
HOPPER TEMPERATURE LIGHT (Option)

When the temperature of the air moving through the hopper dust control system exceeds 140° F, an automatic protection feature shuts down the dust control fan and illuminates the hopper temperature light. When this occurs, shut down the machine and carefully investigate for a possible fire in the hopper, then manually reset the switch.



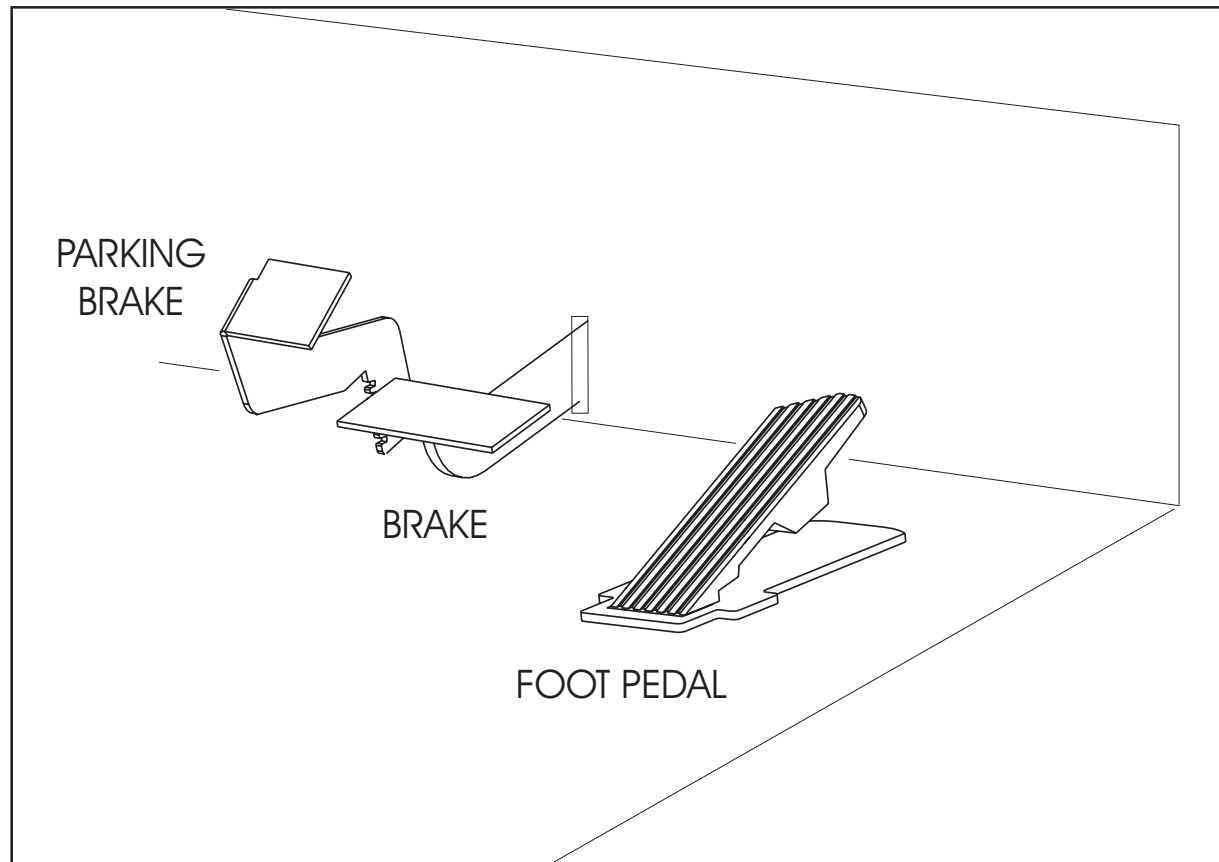
SOLUTION LOW LIGHT

The solution low warning light will illuminate when the solution tank is empty, indicating the end of the scrubbing cycle.



RECOVERY HIGH LIGHT

The recovery high warning light will illuminate approximately 5 minutes before the recovery tank is full, giving ample time to complete the scrubbing cycle, before the mechanical float shuts off the vacuum to the recovery tank.



C1789batt

FIGURE 18

FOOT PEDAL (ACCELERATOR)

The foot pedal, or accelerator, is located on the right side of the operator compartment floor. The foot pedal provides speed control only. To set the machine in motion, push the forward/reverse switch up or down (see figure 3), then push down on the foot pedal. Smoothly releasing the pedal will help slow the machine before breaking.

BRAKE PEDAL

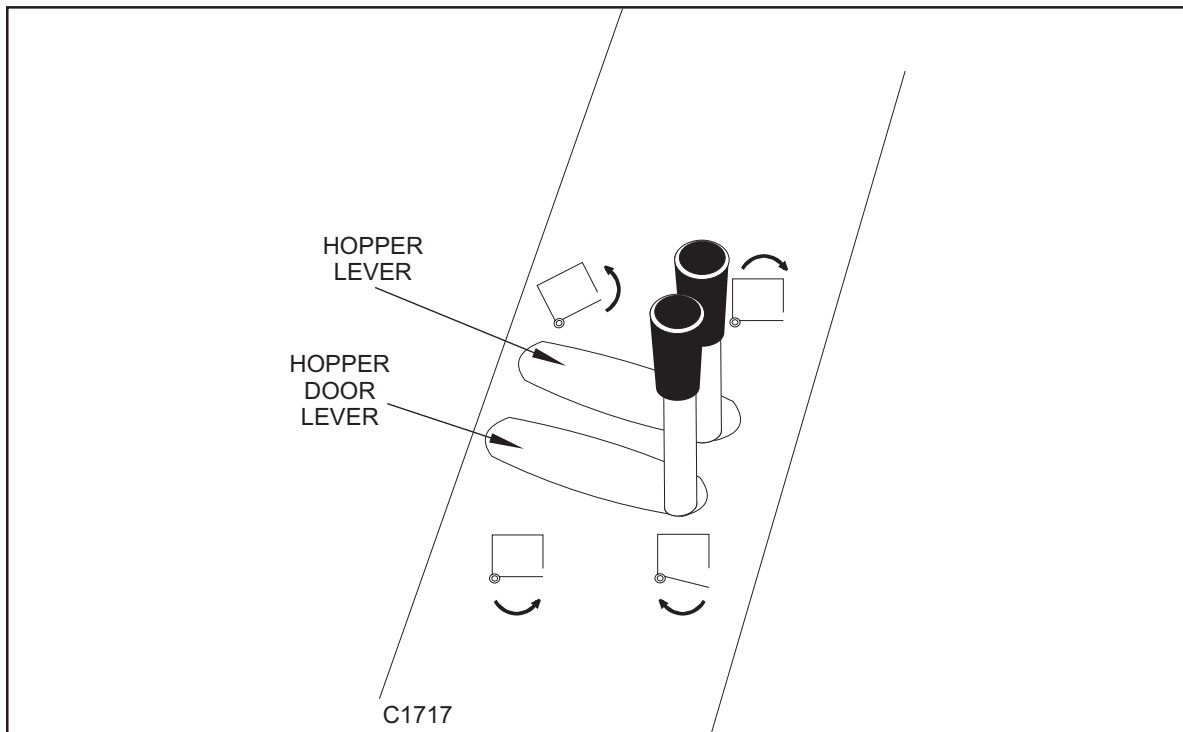
The foot brake is located on the floor of the operator's compartment to the left of the accelerator. To stop, remove foot from accelerator and apply pressure to the brake pedal.

PARKING BRAKE

The parking brake is located just above and slightly left of the foot brake. When engaged, the parking brake "locks" the foot brake in the down position.

To engage the parking brake, press down on the parking brake pedal.

To release the parking brake, press down on the regular brake pedal.



C1717

FIGURE 19

NOTE

The main broom, side broom, dust control and filter shaker turn off automatically when the hopper is dumping and/or the dump door is in a closed position. SEE HOPPER LIFT and HOPPER DUMP DOOR.

HOPPER LIFT LEVER - (See Figure 19)

The hopper lift lever is located to the left of the steering wheel on the left side of the driver's compartment. This lever, which is marked "HOPPER", raises and lowers the debris hopper to ease unloading.



WARNING

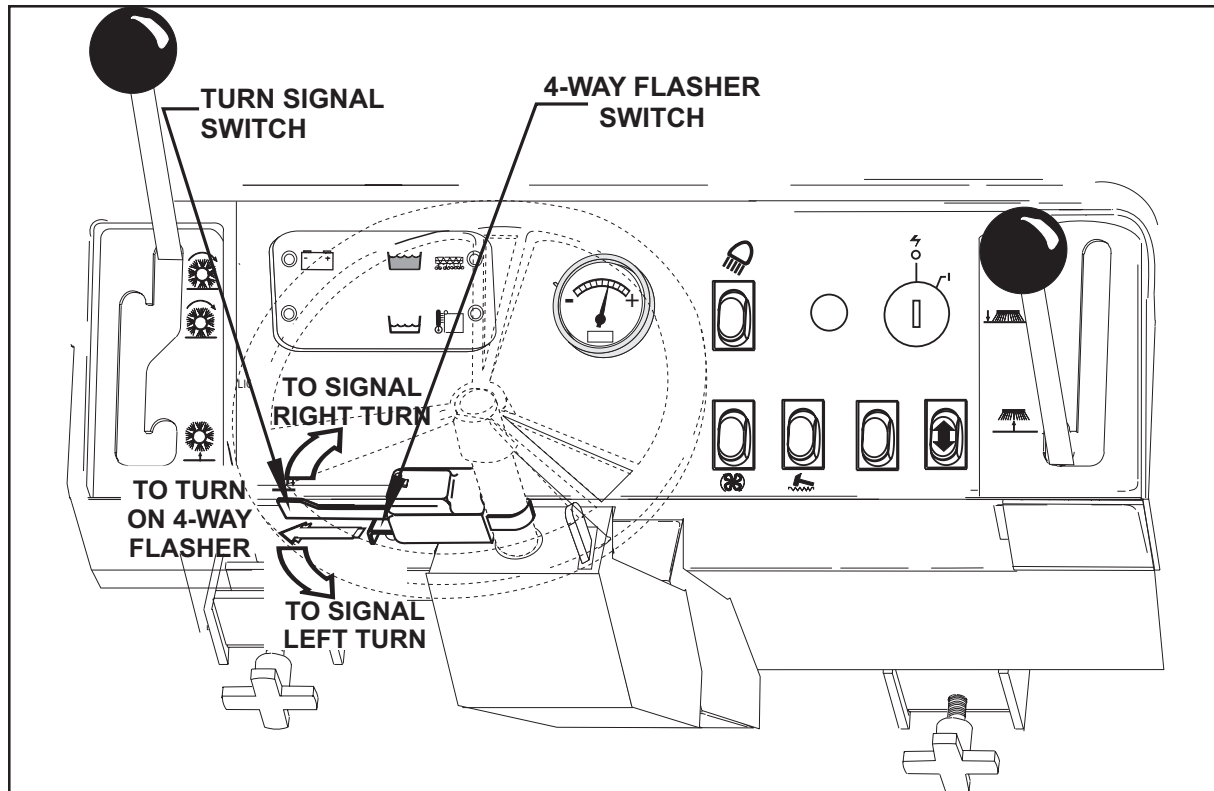
The hopper may drop unexpectedly and cause injury, always engage the safety arm before working under the hopper.

HOPPER DUMP DOOR LEVER - (See Figure 19)

The hopper dump door lever is located to the left of the steering wheel on the left of the driver compartment. This lever opens and closes the hopper door. This lever is located below the hopper lift door and is marked "DUMP DOOR".

NOTE

A switch triggered by the hopper and dump door's position control the sweeping functions, main broom, side broom, dust control, and filter shaker. The hopper must be down and the dump door open to allow these to operate.



C1702batt

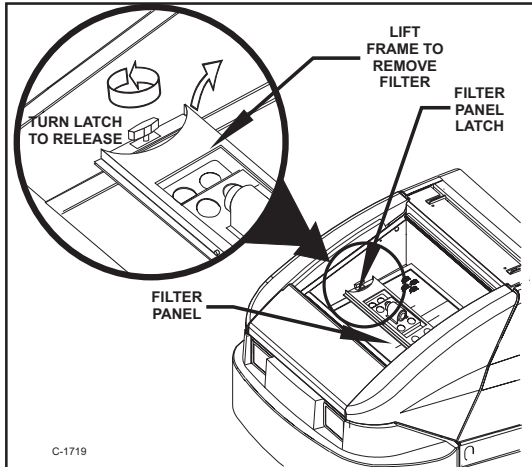
FIGURE 20

TURN SIGNAL - 4-Way (Option) (See Figure 20)

The turn signal option is located on the steering column and works as automotive turn signals work, forward on the lever for right and back on the lever for left. The 4-way flasher will activate when the turn signal lever is pulled out.

BACK-UP ALARM SWITCH (Option) (See Figure 20)

The back-up alarm is activated by a switch that is located under the lower section of the accelerator pedal and the forward/reverse switch. The alarm makes a loud audible noise when the machine is being driven in reverse.



C1719 FIGURE 21

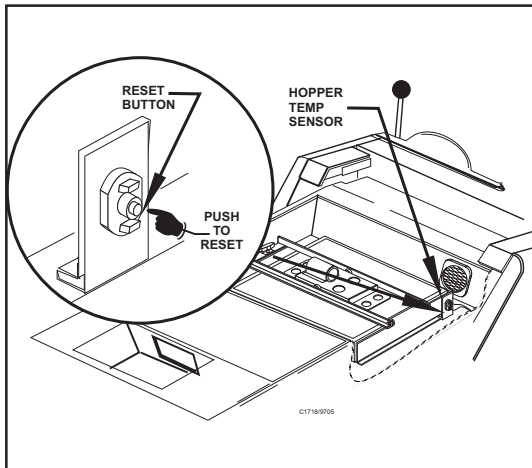
FILTER PANEL LATCH (See Figure 21)

The filter panel is located in the hopper filter compartment and will need to be removed periodically for cleaning or replacement. Removal of the filter panel requires no tools. The hopper cover must be opened to gain access to the filter compartment. The panel filter is held in place by a hinged frame and latch.

To remove the panel filter, turn the knob counterclockwise and lift the hinged frame.

The panel filter can now be lifted out and cleaned or replaced (see Filter Cleaning instructions in this manual).

To install the replacement panel filter, lower the frame and turn the knob clockwise to lock the filter in place.



C1718 FIGURE 22

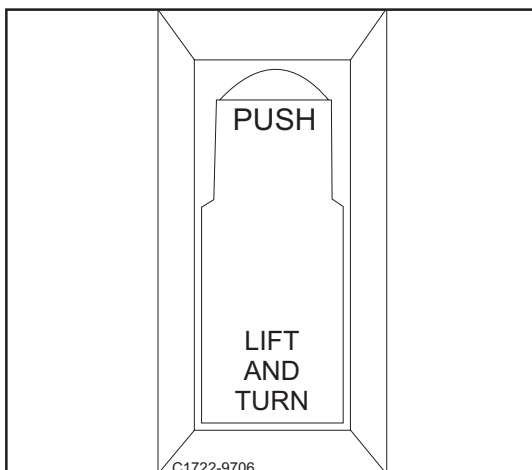
HOPPER TEMP SENSOR (Option) (See Figure 22)

The temp sensor switch monitors the hopper air temperature near the vac fan. When the temperature of the air moving through the hopper exceeds 140°F, the switch is tripped. It turns off the dust control fan and illuminates the hopper temp light on the warning bank.

The hopper temp sensor can be reset thermal switch which is located in the hopper filter compartment near the vacuum fan intake.

When the hopper temp light illuminates, carefully investigate for a possible fire in the hopper.

To reset the temp sensor, press the reset button.



C1722 FIGURE 23

FRONT COVER LATCH (See Figure 23)

The front cover encloses the power source. The cover can be lifted to allow easy access for service and inspection.



WARNING

Operate Only When Lids, Doors, And Access Panels Are Securely Closed.

To open the cover, lift the cover latch lever up and turn the latch ¼ turn. Lift the cover open.

NOTE

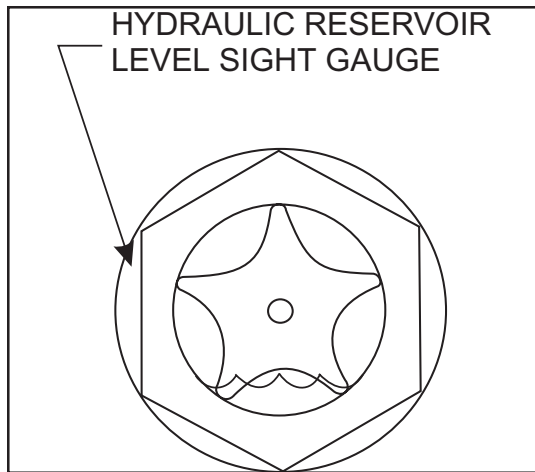
The overhead guard option has a safety latch for storing open cover.

After closing the cover, check it to be certain the latch has fully engaged and is latched.

NOTE

Side covers can be removed for service.

OPERATION OF CONTROLS AND GAUGES



C1730

FIGURE 24

HYDRAULIC RESERVOIR LEVEL SIGHT GAUGE

(See Figure 24)

The sight gauge is located on the inside of the hydraulic reservoir in the engine compartment. The sight gauge is used to indicate the level of fluid in the reservoir. The fluid level must be visible in the sight gauge when the hopper is in the down position.

MAIN BROOM COMPARTMENT DOORS (See Figure 25)

The main broom compartment doors are located behind the front tires on both sides of the machine. The doors provide access to the main broom for service or inspection.



WARNING

Operate Only When Lids, Doors, And Access Panels Are Securely Closed.

Open the right side door to remove or replace the main broom. The right side door is an integral part of the main broom drive system and must be closed for operation.

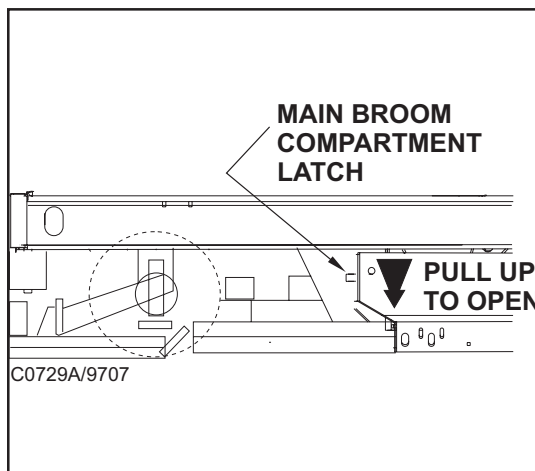
Open the left side broom door for inspection. Check the drive hub for banding and shrink-wrap which have a tendency to get tangled in the broom driver. To open the main broom door, reach inside the hole in the door and lift up on the latch handle. The door latch will automatically engage when the door is closed.

NOTE

Side squeegees mount on doors and the scrub deck must be lowered to slide the doors and squeegees into place.

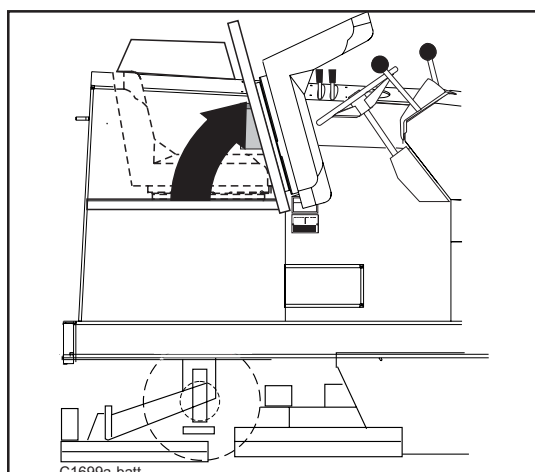
NOTE

For proper function of side squeegees, side squeegees must be positioned so the lift strap is above the scrub deck lift brackets. Damage to the side squeegees could occur if not in the correct position.



C0729A

FIGURE 25



C1699a-batt

FIGURE 26

SEAT COMPARTMENT COVER & PROP LATCH

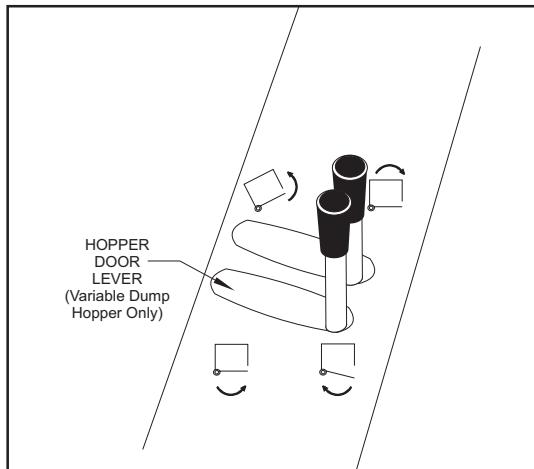
(See Figure 26)

The seat compartment cover opens to allow easy access to various components that will need to be inspected or serviced periodically. The cover opens forward and has a safety latch to hold the cover in the open position.

On battery-powered machines, the compartment below the seat contains the hydraulic pump motor and reservoir.

The seat compartment latch is located under the seat compartment cover and is used to hold the cover open.

To hold the seat compartment cover open, lift the cover and rotate the latch.



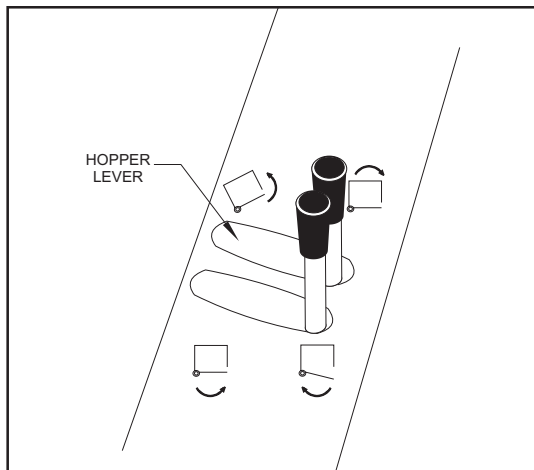
C1717A FIGURE 27

HOPPER DOOR LEVER (See Figure 27)

The hopper door lever is located on the operator's compartment and is used to close and open the hopper dump door. The lever is a two position hydraulic valve that is spring loaded to the center position which "HOLDS" the hopper door in position.

To open the hopper dump door for sweeping or dumping, push the lever to the "OPEN" direction.

To close the hopper dump door for dumping or transporting, push the lever fully back in the "CLOSE" direction, and hold for 3 seconds or until you hear the door close.



C1717B FIGURE 28

HOPPER LIFT LEVER (See Figure 28)

The hopper lift lever is located on the operator's compartment console. The lever is a two position hydraulic valve that controls the operation of the hopper lift system. The lever is spring loaded to the center position which stops hopper movement and "HOLDS" the hopper at the present position.

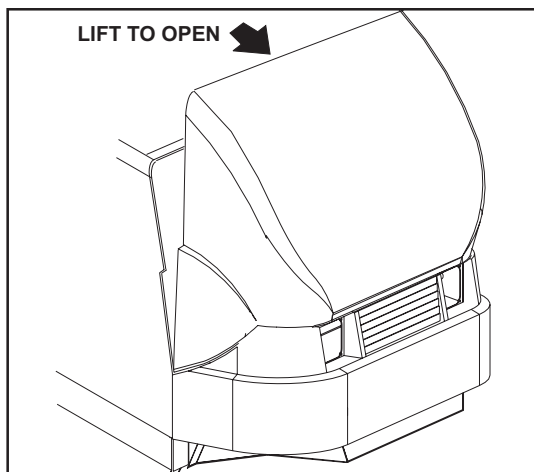
To raise the hopper for dumping, move the lever to the "RAISE" position and hold until the hopper reaches the desired height, then release.



WARNING

The hopper may drop unexpectedly and cause injury, always engage the safety arm before working under the hopper.

To lower the hopper after dumping, move the lever to the "LOWER" position until the hopper is fully lowered and seated in the machine, then release.



C1725A-batt FIGURE 29

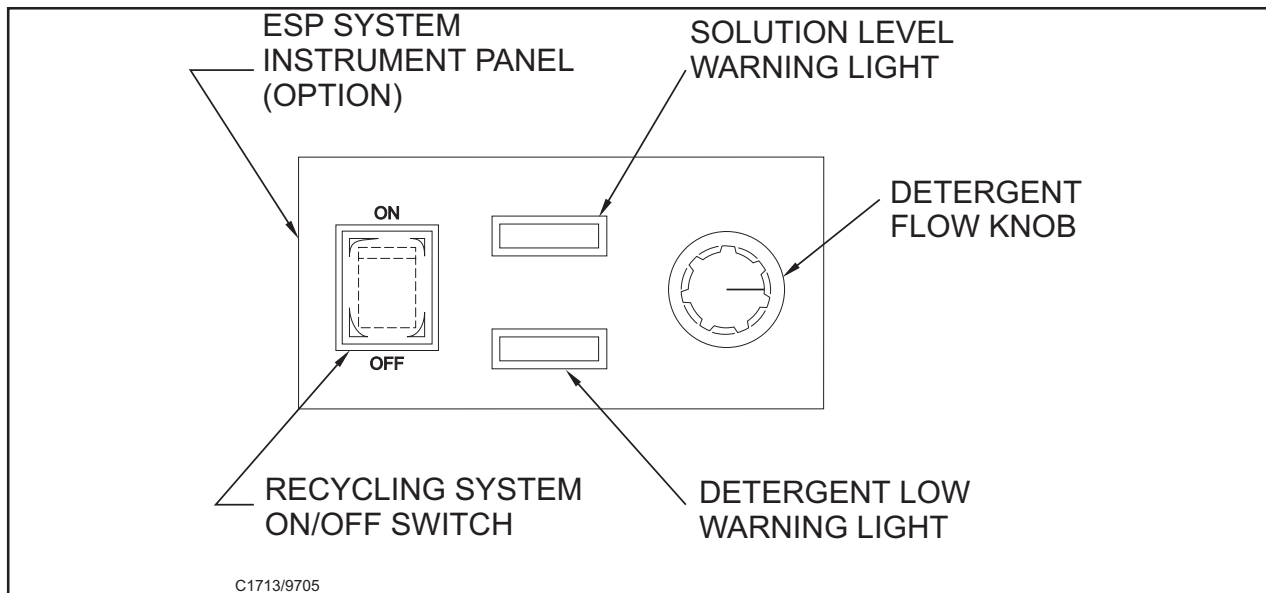
HOPPER FILTER COVER

(See Figure 29)

The hopper filter cover is actually the front cover or "hood" of the machine. It opens forward by releasing latches to access the filter compartment for service/inspection of the dust control filter and optional hopper temp sensor.

Inspect gaskets daily. Replace any gaskets that show signs of deterioration. Failure to maintain the gaskets in serviceable condition will degrade dust control at the floor and will result in less than optimal sweeping performance.

ESP SYSTEM OPERATING INSTRUCTIONS



C1713

FIGURE 30

THE ESP RECYCLING CONTROL PANEL (See Figure 30)

THE ESP RECYCLING SYSTEM ON/OFF SWITCH

This switch turns the ESP recycling system on and off.

NOTE

The solution control lever must be on “FULL” for ESP operation.

SOLUTION LEVEL WARNING LIGHT

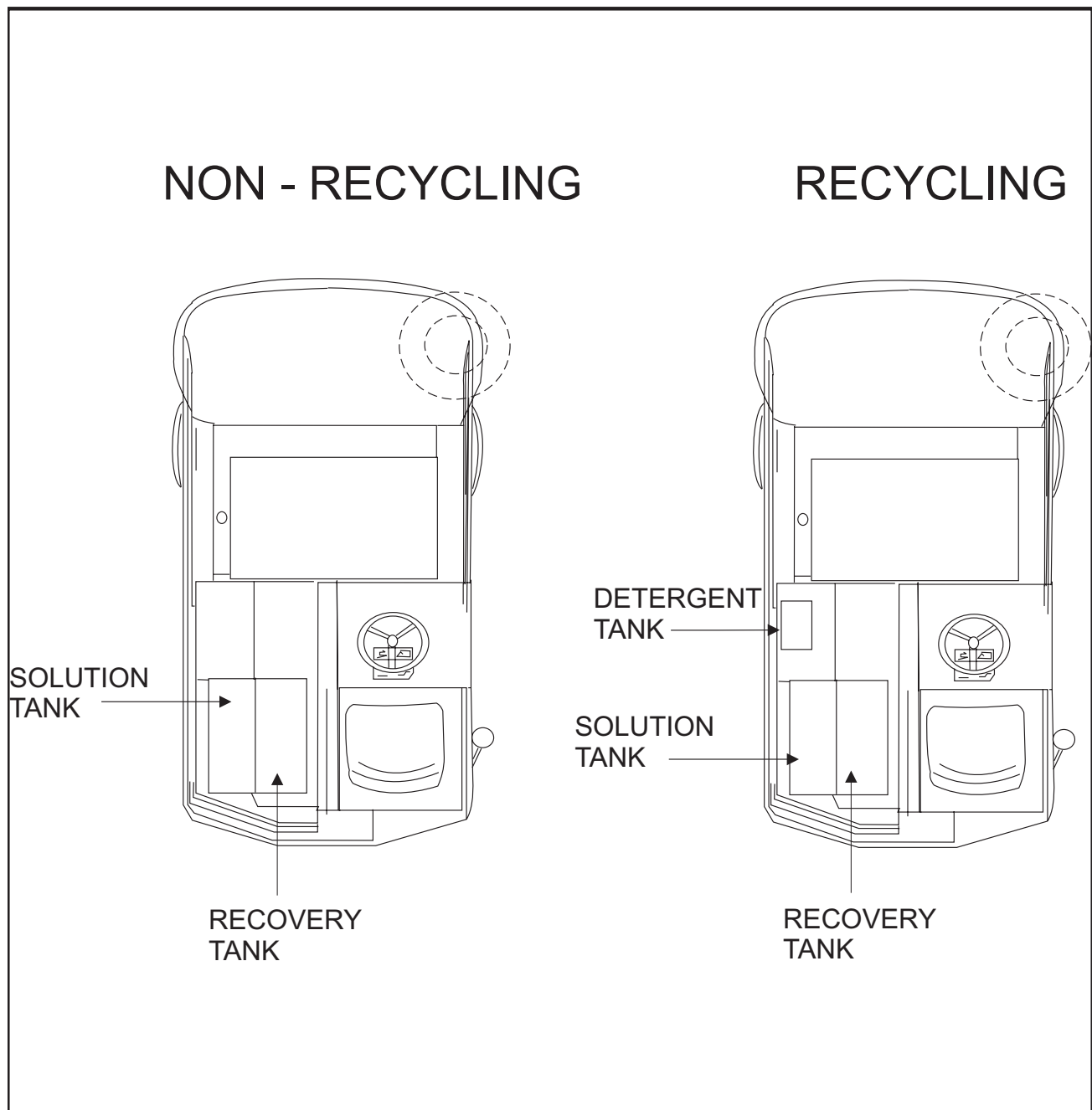
The solution level warning light will go out when the solution tank is empty. Some solution will remain in the recovery tank at the end.

DETERGENT LOW WARNING LIGHT

The detergent light will illuminate when the detergent tank is low, warning the operator to add detergent.

DETERGENT FLOW KNOB

This rotary knob controls the detergent flow into the scrubbing solution. The operator may choose from any detergent setting, for light to heavy cleaning applications. The detergent light will illuminate when the detergent tank is low, warning the operator to add detergent.



C1728

FIGURE 32

THE SCRUBBING SYSTEM - HOW IT WORKS

There are two scrubbing systems available for the ATS 46/53 machine, the non-recycling or standard scrubbing system and the recycling or ESP scrubbing system.

THE NON-RECYCLING OR STANDARD SCRUBBING SYSTEM - HOW IT WORKS

During the scrubbing process, detergent solution water from the solution tank is fed to the solution line. There it is fed to the floor where three disc scrubbing brushes work to dislodge soil.

After scrubbing, the dirty solution is vacuumed from the floor and discharged into the containment chamber in the forward portion of the recovery tank, where a system of baffles helps to clarify the solution.

Sensors in each tank will indicate, by lights on the control panel, when the water in the solution tank is too low or when the water in the recovery tank is too high.

ESP SYSTEM OPERATING INSTRUCTIONS

THE RECOVERY OR ESP AND AUTOFIL SYSTEM - HOW IT WORKS

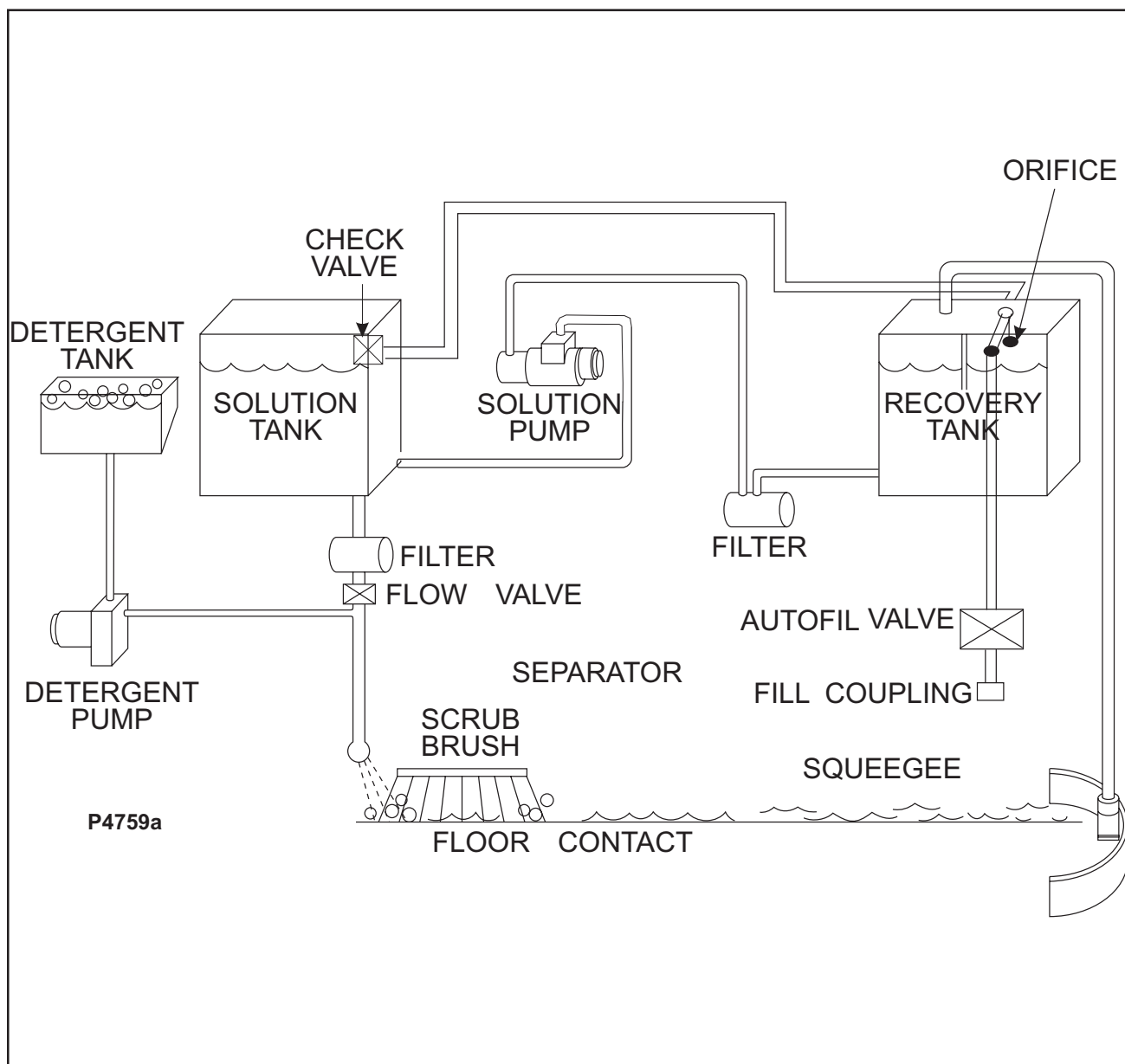
During the scrubbing process, filtered water from the solution tank is fed to the solution line, where it combines with detergent from the metering pump. This mixture is then fed to the floor where three disc scrubbing brushes work to dislodge soil.

After scrubbing, the dirty solution is vacuumed from the floor and discharged into the recovery tank. At intervals, a float switch activates the recycling pump, which sends filtered solution from the recovery tank to the solution tank. Detergent is added continuously to solution water from the flow valve.

The autofil system distributes water from the supply hose into the recovery and solution tanks. Then a solenoid valve is closed when the proper level in the solution tank is reached.

NOTE

Both tanks must be drained and cleaned before filling.
Tuck solution tank drain hose behind bumper during operation hose



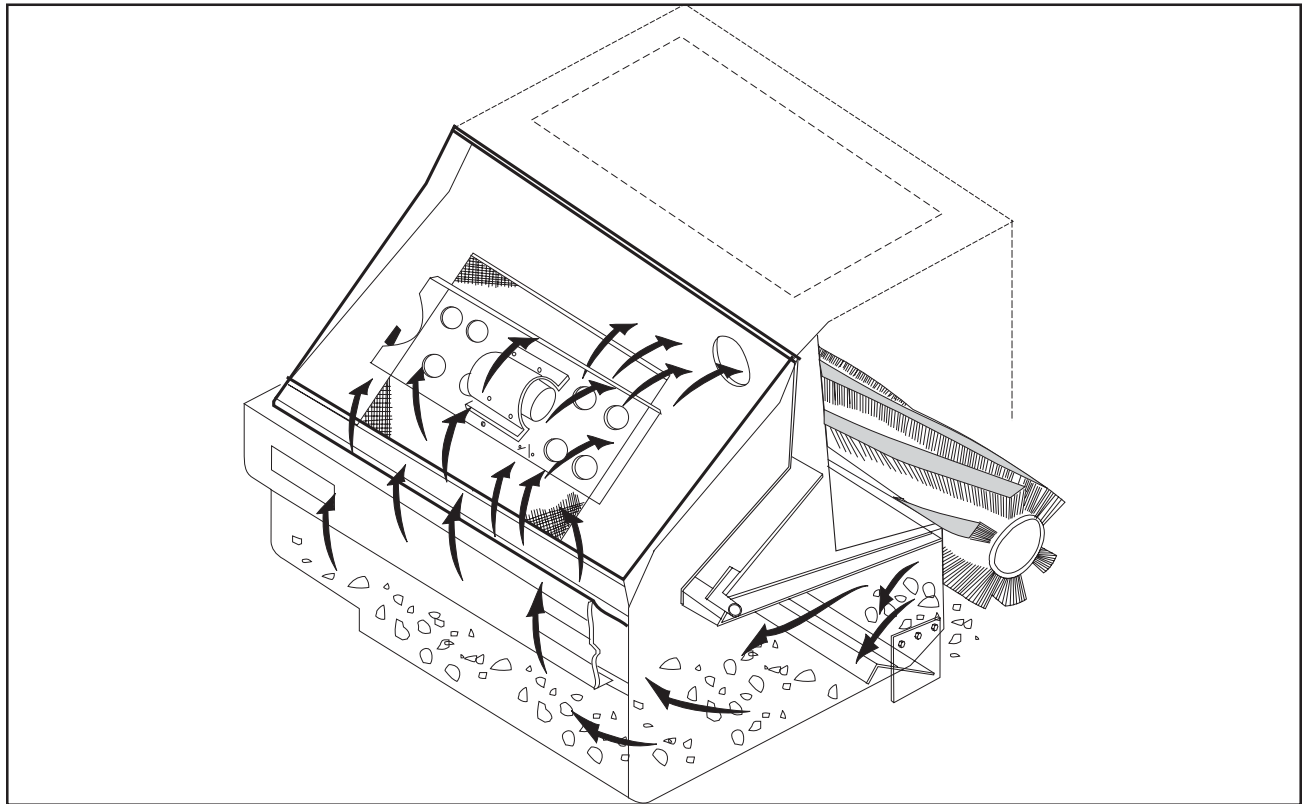
P4759A

FIGURE 33

SWEEPING AND DUST CONTROL SYSTEMS-HOW THEY WORK

ATS 46/53 machines are equipped with a sweeping and dust control system. (See Figure 34)

DUST CONTROL



C1731

FIGURE 34

BEFORE STARTING THE MACHINE

1. Set parking brake.
2. Make sure all controls are in the "OFF" position.
3. Be sure the directional control switch is in the center position.
4. Ensure the batteries have been fully charged and serviced (see battery service instructions).

NOTE

Before starting the machine, perform the pre-start checklist.

PRE-START CHECKLIST

1. Check hydraulic fluid level.
2. Check all systems for leaks.
3. Check brakes and controls for proper operation.
4. Check broom patterns.
5. Check to ensure that all covers, panels and access doors are securely closed.

STARTING BATTERY MACHINES

Starting the battery powered models is accomplished by turning the key switch to the "I" (on) position. It is important to note that the batteries should be fully charged and serviced prior to using the machine.

OPERATING INSTRUCTIONS

EMPTYING THE DEBRIS HOPPER

1. Remove foot from accelerator and stop the machine.
2. Engage the parking brake.
3. Move the hopper dump door lever to the "CLOSE" position until the door is closed.
4. Move the hopper lift lever to the "RAISE" position until the hopper reaches the desired height.
5. Disengage the parking brake.
6. Drive forward slowly with hopper raised to clear the refuse container before opening hopper dump door.
7. Stop machine and engage the parking brake.
8. Push the hopper dump door lever forward to the "OPEN" position. This will allow debris in the hopper to fall out into the refuse container.
9. Move the hopper dump door lever to the "CLOSE" position until the door is closed.
10. Release the parking brake.
11. Drive slowly in reverse to clear the refuse container.
12. Stop machine and engage the parking brake.
13. Move the hopper lift lever forward to the "LOWER" position and hold until the hopper is closed.
14. Move the hopper dump door lever to the "OPEN" position until the dump door opens.



WARNING

Do not turn off the machine with the hopper in the lifted position.

NOTE

After stopping the machine, perform these post-operation checks.

POST-OPERATION CHECKLIST

1. Clean the debris hopper.
2. Check sweeping brooms for wear or damage.
3. Check all flaps for wear, damage and adjustment.
4. Check all systems for leaks.
5. Charge and service motive power batteries (see battery charging instructions).
6. Check squeegees for damage.

BATTERY CHARGING INSTRUCTIONS

Charge the batteries at the end of each day or when the battery condition meter indicates low battery voltage. The batteries need to be charged when the needle stays in the "red" zone while the machine is being operated. When charging the batteries, only use the quick disconnect provided to ensure correct polarity. Follow the instructions below.

Check the liquid level in the batteries at least once a week and add water when low. Use only distilled water. Fill the batteries after charging them to prevent electrolyte from spilling over onto the tops of the batteries during the charging process.



WARNING

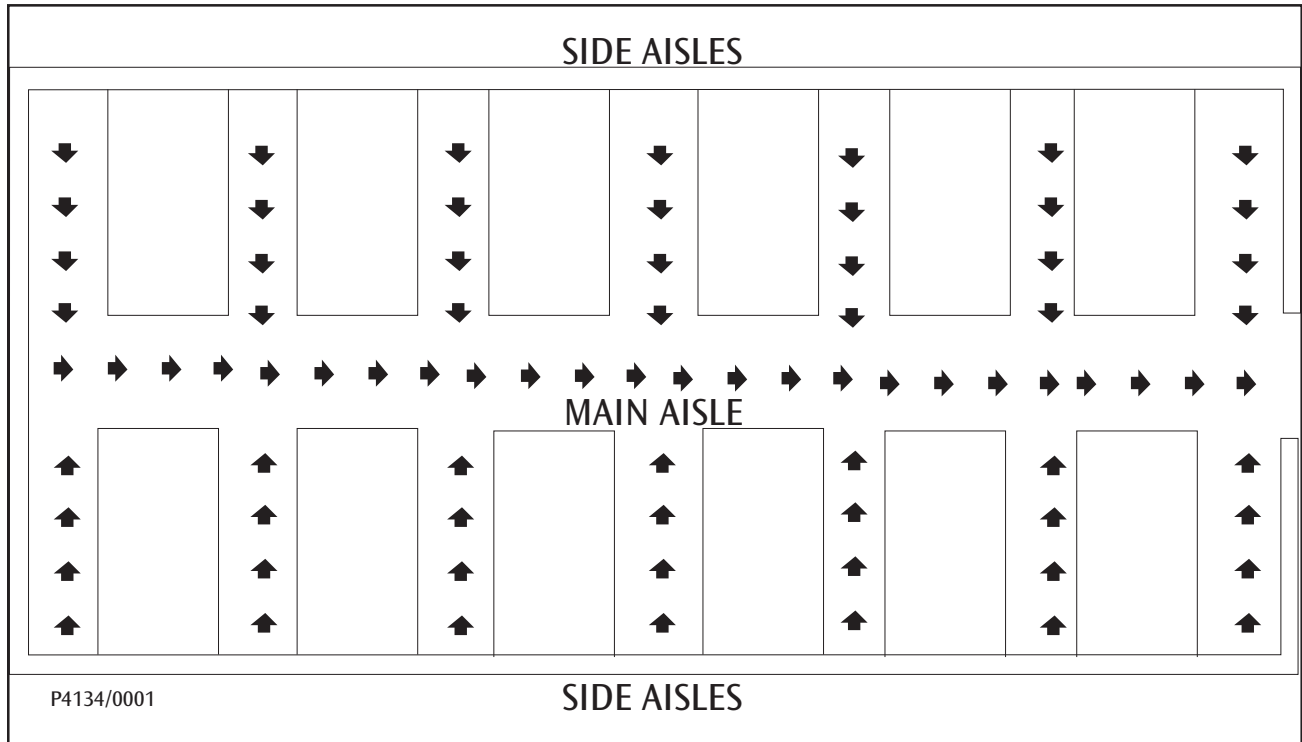
The use of an extension cord with the charger should be avoided. Risk of fire and electrical shock is possible if the wrong type or size extension cord is used. Locate all cords so they cannot be stepped on, tripped over, or otherwise subjected to damage or stress.

STORAGE FOR BATTERY-POWERED MACHINES

When batteries are not in use, they will discharge much sooner in cooler temperatures than in warm temperatures. Recharging and storing is more efficient at room temperature.

Do not discharge the batteries excessively (do not go below 80%). Excessive discharge can cause polarity reversal of the individual cells in the battery. This will lead to complete failure of the batteries.

Use a hydrometer to monitor the specific gravity of the individual cells in the batteries. When checking the specific gravity of the batteries, you should not see a large difference between the individual cells. The batteries may need to be replaced if the battery shows a significant difference of specific gravity between the cells.



P4134

FIGURE 35



WARNING

Do not turn the steering wheel sharply when the machine is in motion. The machine is very responsive to movement of the steering wheel. Do not make sudden turns. Scrub in straight paths. Do not bump posts. Do not scrape the sides of the machine.

When the machine is in motion, do not push the foot pedal all the way down. This will put a strain on drive system.

1. Plan your sweeping and scrubbing in advance. Try to arrange long runs with minimum stopping and starting. Sweep debris from narrow aisles out into main aisles ahead of time. Do an entire floor or section at one time.
2. Pick up oversize debris before sweeping.
3. Allow a few inches of overlap of sweep and scrub paths. This will eliminate leaving dirty patches.
4. Do not turn steering wheel too sharply when the machine is in motion. The machine is very responsive to movement of the steering wheel, so avoid sudden turns.
5. Try to follow as straight a path as possible. Avoid bumping into posts or scraping the sides of the machine.
6. When placing the machine in motion, avoid slamming the directional control pedal all the way forward quickly. This is equivalent to starting in "High" and puts needless strain on the engine and drive system.
7. Always allow the machine to warm up before operating in cold temperatures.
8. Periodically turn the sweeping broom end-over-end to prevent the bristles from "setting" in one direction.

NOTE

Replace the sweeping broom when the bristles are worn to 3 inch (8cm) length. Replace disc brushes when bristles are reduced to ½ inch (1.3 cm) in length. Replace squeegee rubbers when all usable edges have become rounded with wear.

SERVICE CHART

SERVICE CHART

Check items for proper operation. If service is required, please contact an authorized American-Lincoln dealer. For best performance, replace worn parts with genuine American-Lincoln parts.

EVERY 8 HOURS or DAILY operation check and clean/adjust if necessary:

1. Inspect panel filters for damage and clean them.
2. Check hydraulic fluid level.
3. Check all flaps for wear or damage.
4. Check brooms for wear or damage, adjust as required.
5. Check panel filters (clean side) for leakage.
6. Check brake pedal and parking brake.
7. Check hydraulic oil filter.
8. Check battery electrolyte level (unless maintenance-free battery).
9. Check all fluid system components for leaks.

50 HOUR (WEEKLY) MAINTENANCE CHECKLIST

10. Check solution tank (recycling or ESP system).
11. Check solution filter screen (recycling or ESP system).
12. Check recovery tank.
13. Check recovery tank screens and filters.
14. Inspect scrub brushes for wear or damage.
15. Inspect rear and side squeegees for wear or damage.
16. Check battery electrolyte level (unless maintenance-free battery).
17. Check all hydraulic hoses for wear or cuts.
18. Rotate main brush (end-over-end).
19. Clean or replace panel filters.
20. Lubricate dump system and drive wheel pivot points.

100 HOUR MAINTENANCE CHECKLIST

21. Lubricate drive wheel, swivel wheel bearings, and steering rack guide.
22. Lubricate front wheel bearings.
23. Lubricate all moving joints.
24. Check brake shoes for wear and adjust accordingly.
25. Lubricate all 3 DANHOUSER bushings with NAPA #765-1363 or equivalent anti-seize lubricant. The bushings are located on the steering, scrub deck lift, squeegee lift, variable dump hopper door.

250 HOUR MAINTENANCE CHECKLIST

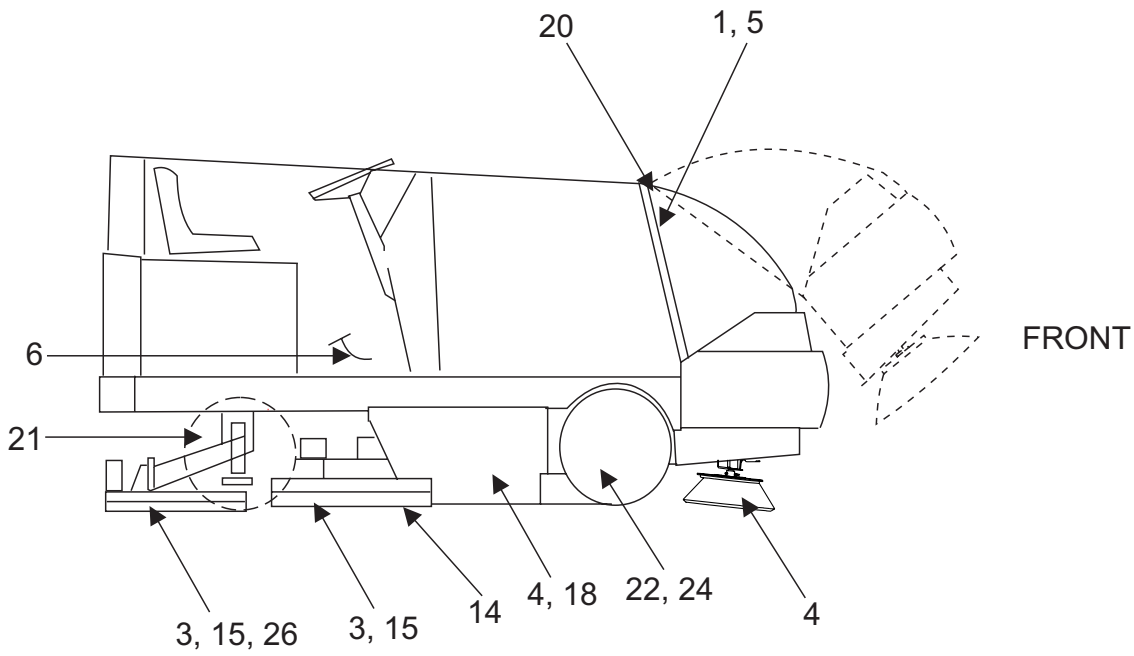
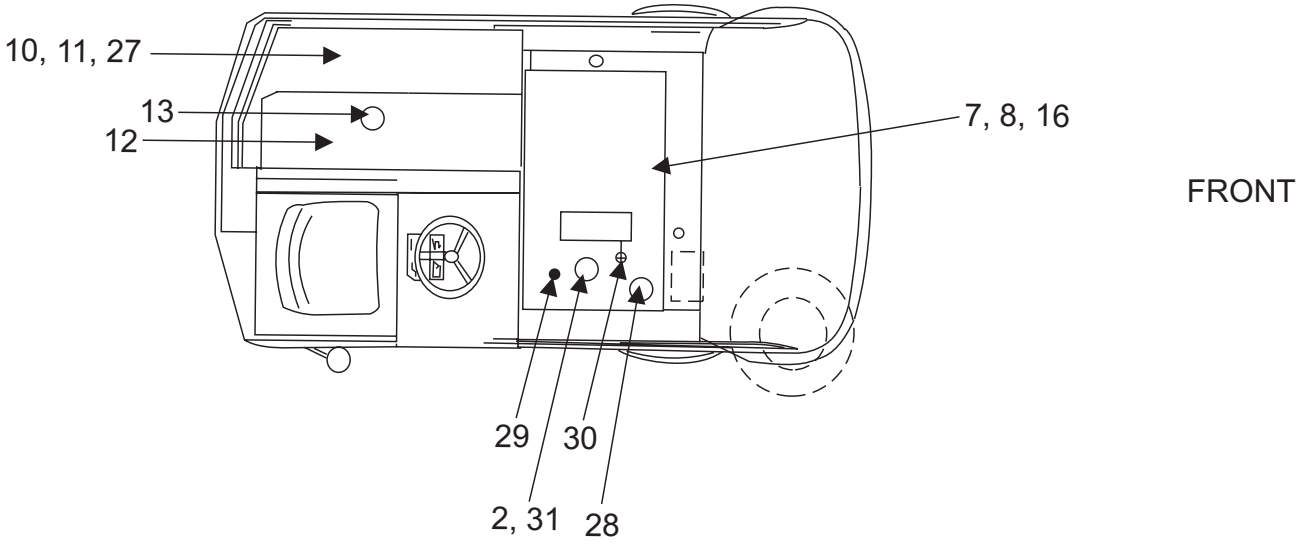
26. Lubricate squeegee casters.
27. Clean solution tank and filter screen.
28. Replace hydraulic filter element.

400 HOUR MAINTENANCE CHECKLIST

29. Clean hydraulic reservoir.
30. Clean hydraulic intake strainer.
31. Change hydraulic fluid.

500 HOUR MAINTENANCE CHECKLIST

32. Inspect brushes on pump and drive motors for wear. Replace as needed.
33. Inspect drive system cables for wear.



Service chart-batt

SERVICE PRECAUTIONS

SERVICE PRECAUTIONS

For safety, read and follow the service precautions below. Know the hazards associated with the equipment you are working on to prevent personal injury or damage to equipment.

Refer all Maintenance and Service Requirements to Qualified Maintenance Personnel.



WARNING

Do not attempt to Service this Machine until you have read and understand all Safety Warnings associated with the equipment you are working on.



WARNING

Only authorized personnel should do electrical repairs. Consult your American-Lincoln Authorized Distributor to perform service and/or repairs. Use only genuine American-Lincoln parts.



WARNING

Unexpected movement could cause injury. Always park on a level surface, turn key off, and engage parking brake before working on the machine.



WARNING

Always empty the hopper and disconnect the batteries before starting any maintenance work. Keep all fasteners tight. Keep adjustments within the specifications outlined for this machine.



WARNING

Always wear eye protection and protective clothing when working near batteries. Do not put tools or other metal objects across the tops of the batteries. NO SMOKING.



WARNING

The hopper could fall and cause serious injury. Always engage the hopper safety arm before working under the hopper.



WARNING

Pinch points may cause injury. Stay clear of moving parts.



WARNING

To maintain the stability of this machine in normal operation, the overhead guard or any similar equipment installed by the manufacturer as original equipment should not be removed. If it becomes necessary to remove such equipment for repair or maintenance, reinstalled before placing the machine back in operation.

SWEEPING SYSTEM SERVICE**MAIN BROOM**

To prevent the broom from “setting” in one direction and to provide the maximum life of the broom it is recommended that the broom be turned end over end periodically.

CHECKING THE MAIN BROOM SWEEP PATTERN

Check the main broom sweep pattern after changing the broom or when poor sweeping performance is encountered while sweeping.

1. While the machine is not moving, lower the main broom to the “SWEEP” position and let machine sweep in one spot for a short period of time.
2. Before moving the machine, raise main broom lever to the “UP” position and move the sweeper forward enough to see the pattern left by the main broom bristles on the floor.
3. Check the width of the pattern on the floor to determine if the main broom requires adjustment.

-A normal sweep pattern left on the floor will be between 1 and 2 inches wide.

-A pattern that is more than 2 inches wide indicates the broom linkage needs to be adjusted “UP.”

-A pattern that is less than 1 inch wide indicates the broom linkage needs to be adjusted “DOWN.”

ADJUSTING THE MAIN BROOM HEIGHT

When changing the sweep height adjustment it is recommended that the bolt be adjusted 1 turn at a time. After adjustment, recheck the sweep pattern to determine if further adjustment is necessary.

-Turn the adjustment knob counterclockwise to INCREASE the sweep pattern width.

-Turn the adjustment knob clockwise to DECREASE the sweep pattern width.

REPLACING THE MAIN BROOM

The Main Broom should be replaced when the bristles become worn to less than 2". The main broom is held in place by the right side broom door. This feature provides for easy removal and installation of the main broom without the need for special tools or equipment. Follow the instructions below for main broom removal & replacement.

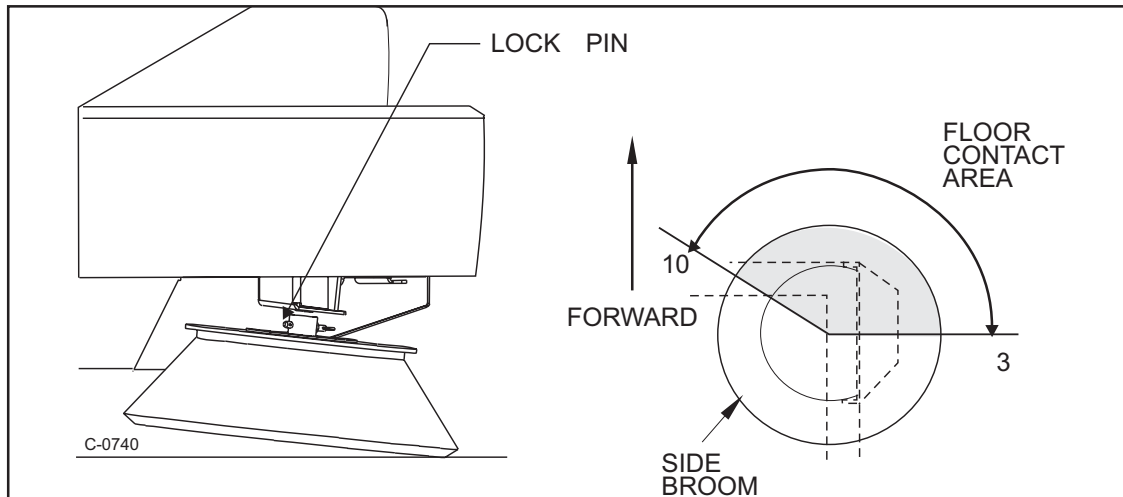
1. Park sweeper on a smooth level surface, engage parking brake, turn key switch to “O”, place the main broom lever in the “SWEEP” position.
2. Lift the door latch to open the right side broom door.
3. Swing the broom drive idler hub out to clear the main broom.
4. Remove the broom from the broom compartment.
5. Install the replacement broom. Pay special attention to the slots on the broom, it may be necessary to rotate the broom so the tabs on the drive hub align with the slots on the broom.
6. Swing the idler hub to engage the main broom and close the access door. Check the door latch for proper engagement when closed.
7. Check the Main Broom sweep pattern and adjust as necessary.

MAIN BROOM LEVEL ADJUSTMENT

The main broom level is factory set and should not need adjustment. If the level becomes out of adjustment and the broom bristle contact pattern is not an even 1" to 2" wide, the broom arm lift frame will need to be adjusted. The frame is supported by two plates located inside the broom doors. The carriage bolts that secure the plates to the frame will need to be loosened. The frame can then be leveled and the bolts re-tightened.

SERVICE INSTRUCTIONS

SIDE BROOM SERVICE



C0740

FIGURE 36

SIDE BROOM

The Side Broom sweeping angle is not adjustable. However, the height of the side brooms can be adjusted to compensate as the broom becomes worn from use. Always check and adjust the sweep pattern after changing the side broom.

CHECKING THE SIDE BROOM SWEEP PATTERN

ADJUSTING THE SIDE BROOM HEIGHT

Turn the side broom adjustment knob to change the side broom sweep height. Recheck for proper sweep pattern after adjustment.

- Turn the adjustment knob counterclockwise to INCREASE the sweep pattern width.
- Turn the adjustment knob clockwise to DECREASE the sweep pattern width.

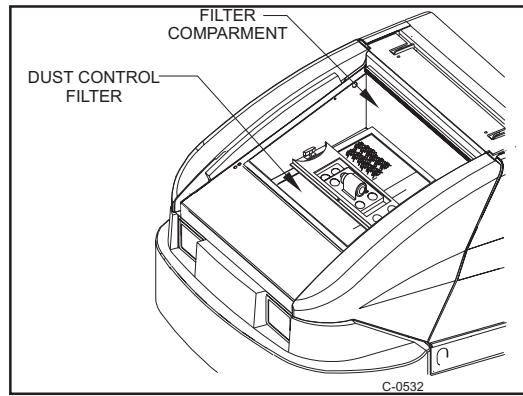
SIDE BROOM SERVICE

1. Park the machine on a smooth level surface.
2. Place the side broom lever in the "DOWN" position.
3. Move the brooms control lever to the "ON" position.
4. While staying in place allow the side broom to sweep for a short period of time. (Allow enough time for the side brooms to leave a clean footprint on the floor).
5. Place the side broom lever in the "UP" position.
6. Move the brooms control lever to the "OFF" position.
7. Back the sweeper away from the area where the pattern was left.
8. Turn the key switch to the "OFF" position and engage the parking brake.
9. Leave the operator's compartment and check the pattern to determine the floor contact area.
10. Determine if adjustment to the side brooms height is necessary by examining the floor contact area. The broom should contact the floor as shown in Figure 36. Adjust the side broom height if the contact area on the floor does not match the diagram.

REPLACING THE SIDE BROOM

Change the side brooms when the bristles become worn to less than 3 inches length.

1. Park the machine on a smooth level surface, turn key switch to "O" Position and engage parking brake.
2. Place the side brooms lever in the "UP" position.
3. Remove the lock pin that holds the broom flange to the motor shaft.
4. Disassemble the flange from the broom by removing the screws that hold the flange to the broom.
5. Assemble the flange to the replacement broom and fasten using the hardware removed.
6. Install the replacement broom on the shaft and insert the lockpin.

HOPPER SERVICE

c0532

FIGURE 37

**WARNING**

**The hopper could fall and cause serious injury.
Always engage the hopper safety arm before working under the hopper.**

HOPPER

The hopper houses the debris compartment, the dust control filter and the removable dust baffle. For maximum performance and service life, keep the hopper clean and inspect the seals and flaps daily.

Clean the hopper prior to parking the sweeper at the end of the day. A clean hopper will make inspecting the flaps and seals much easier and will prevent premature deterioration of hopper components. Do not leave the hopper full of debris while in storage or when parked for extended periods of time.

CLEANING THE HOPPER

Once the hopper has been emptied the inside of the hopper should be rinsed out with water.

CHECKING THE HOPPER SEALS

The hopper seals are important to positive dust control while sweeping. Damaged seals will reduce vacuum pressure at the broom. Inspect for cuts, tears and proper positioning of the seal material. Replace all seals that become damaged.

DUST CONTROL FILTER

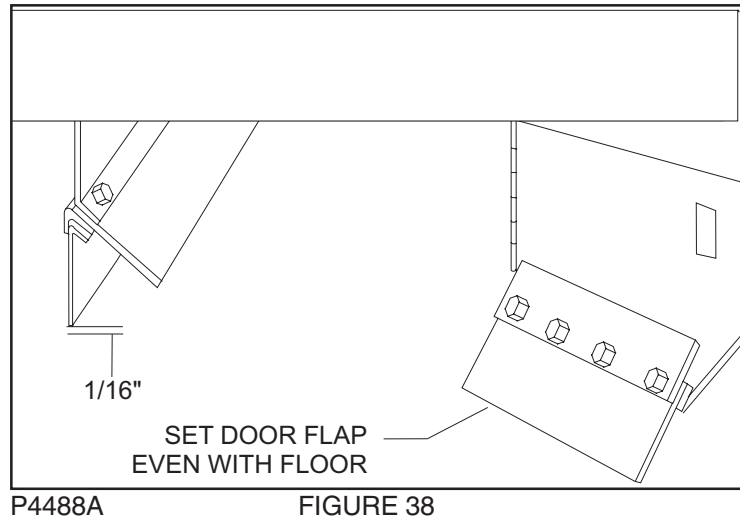
The dust control filter should be checked daily for damage and cleaned if necessary. A damaged filter must be replaced to prevent damage to other dust control system components. Inspect the filter for tears in the filter media or excessive dirt lodged in the pleats. A tear in the filter media will allow dirt to pass through the filter and can be easily seen as a dirty patch on the top side on the filter. Cleaning of the filter is necessary when the filter shaker fails to adequately clean the pleats.

CHECKING THE DUST CONTROL FILTER

1. Park the machine on a smooth level surface, turn the key switch to the "O" position and engage the parking brake.
2. Raise the hopper lid for access to the filter compartment.
3. Turn the filter latch, lift the filter frame and remove the filter.
4. Inspect the panel filter for tears and clean or replace if necessary.
5. Reinstall the filter, lower the filter frame and engage the filter latch.
6. Close the hopper cover.

CLEANING THE DUST CONTROL FILTER

Clean the dust control filter when the shaker fails to adequately clear the filter. The filter can be cleaned with compressed air not to exceed 100 PSI. To clean the filter with compressed air, apply the compressed air to the topside of the panel to backflush the lodged dirt from the filter pleats. Be careful to not damage the filter media while cleaning. The filter can be cleaned with a solution of soap and water. If this cleaning method is used do not use the filter until it has completely dried.



REPLACING THE DUST CONTROL FILTER

Change the filter panel when damage is evident.

1. Park the machine on a smooth level surface, turn the key switch to the "O" position and engage the parking brake.
2. Open the hopper compartment cover to gain access to the filter compartment.
3. Turn the latch on the hinged frame counterclockwise and lift the frame .
4. Remove the filter panel.
5. Install replacement filter, lower the hinged frame and engage the latch.
6. Lower the filter compartment cover.

DUST FLAPS

The dust flaps are very important to sweeping and dust control and are susceptible to damage and should be inspected daily and maintained in good condition.

CHECKING THE DUST FLAPS

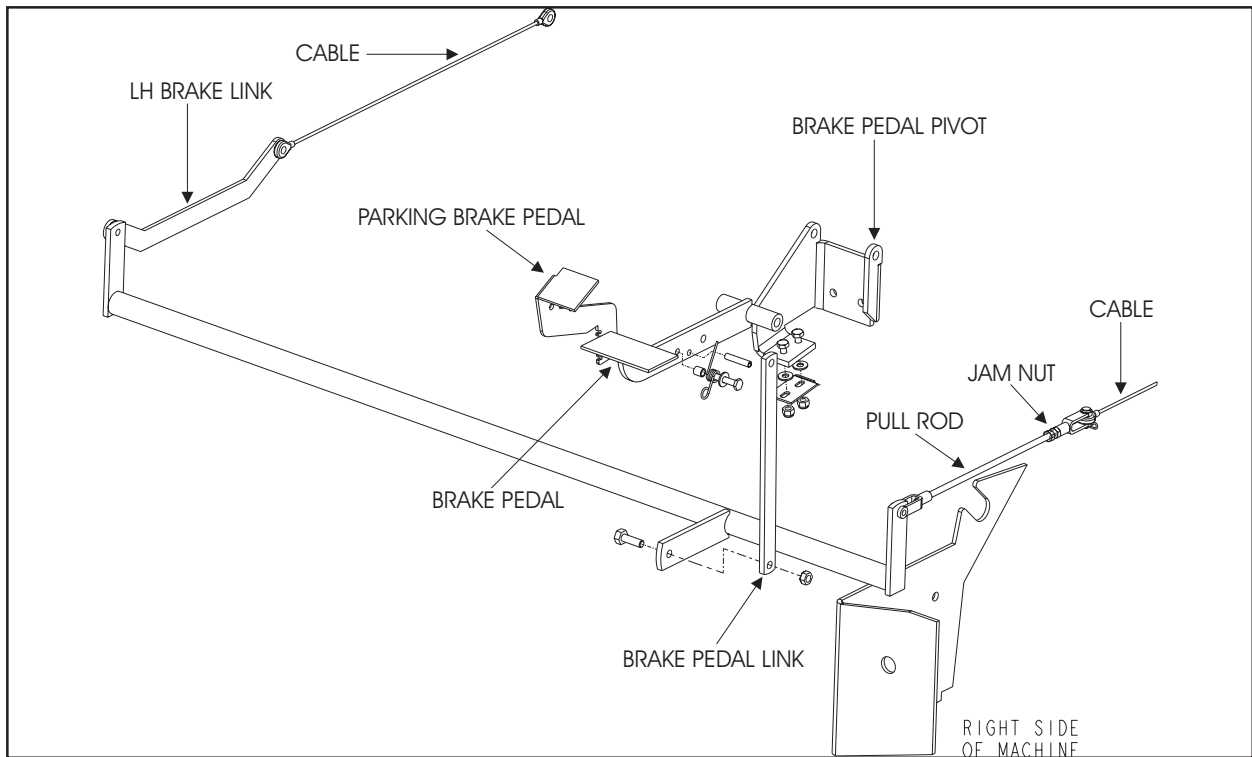
The dust flaps are used on the wheel well, broom chamber and broom door. Inspect the flaps daily and replace any flap that shows signs of wear or deterioration. All flaps should be replaced when worn or damaged to the point that they can no longer perform their normal function. The adjustable flaps have slotted mounting holes to facilitate adjustment.

ADJUSTING THE DUST FLAPS

Adjust the flaps so there is a 1/8" to 1/16" gap between the floor and the bottom edge of the flaps. The rear flap adjustment is 1/16" (16 cm.) above the floor.

1. Park the machine on a smooth level surface and engage the parking brake.
2. Loosen the flap retaining screws and adjust the flap to clear the floor and leave a 1/16" to 1/8" gap.
3. Tighten flap-retaining screws while holding flap in position.
4. Drive the machine on a smooth surface and recheck the flaps for proper floor clearance.

BRAKE SERVICE



C1720batt

FIGURE 39

BRAKES

The service brakes are located on the front wheels and are operated by the brake pedal and the parking brake. Check the brakes daily for proper operation and inspect the brake pads for wear every 100 hours of operation.

ADJUSTING THE BRAKE PEDAL

Perform this adjustment to ensure proper pedal height and linkage operation. The brakes are properly adjusted when the brakes hold the sweeper on an 8-degree ramp. The brakes need adjusted if the pedal travels closer than 1" to the floor of the operator's compartment when the brakes are fully engaged.



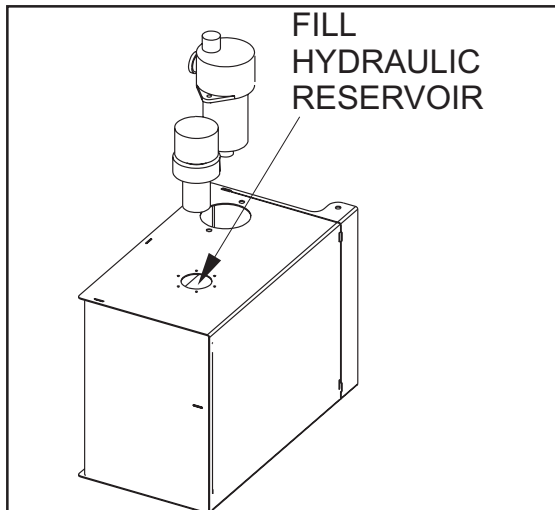
WARNING

Always park on a level surface, chock tires and observe safety procedures when adjusting the brakes.

ADJUSTING THE BRAKES

When adjusting the brake clevis, follow these steps:

1. Right hand brake cable slack.
2. Adjust parking brake for maximum engagement.
3. With parking brake "off," check L.H. wheel which should rotate with minimum drag. (Not completely free)
4. Adjust R.H. brake to provide minimum drag when released.



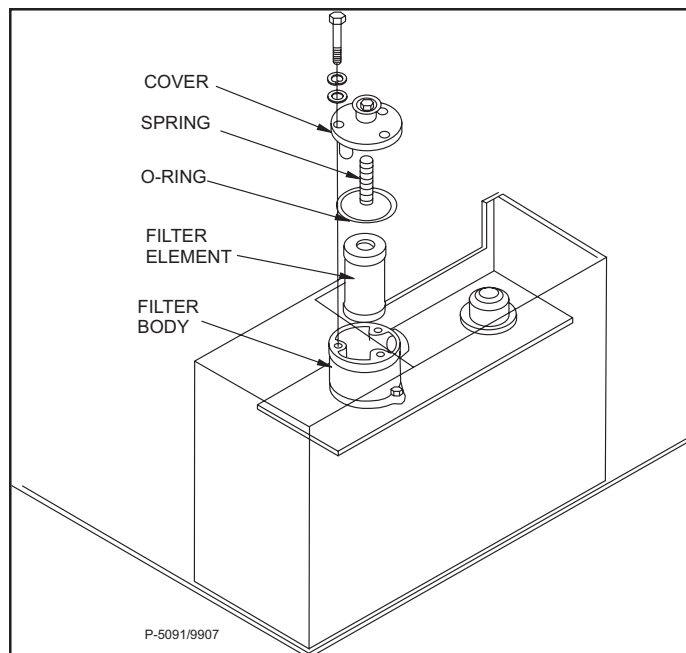
C1691A FIGURE 40

FILLING THE HYDRAULIC RESERVOIR

1. Access to the hydraulic reservoir is located in the seat compartment.
2. Open the hydraulic reservoir breather filter cap.
3. Remove any debris that is in the breather filter cap screen.
4. Fill the reservoir until the fluid is at the "FULL" line on the hydraulic fluid sight gauge. The sight gauge is located on the center side of the hydraulic reservoir.
5. Close the hydraulic reservoir breather filter cap.
6. Close the seat compartment.

CLEANING THE HYDRAULIC SYSTEM

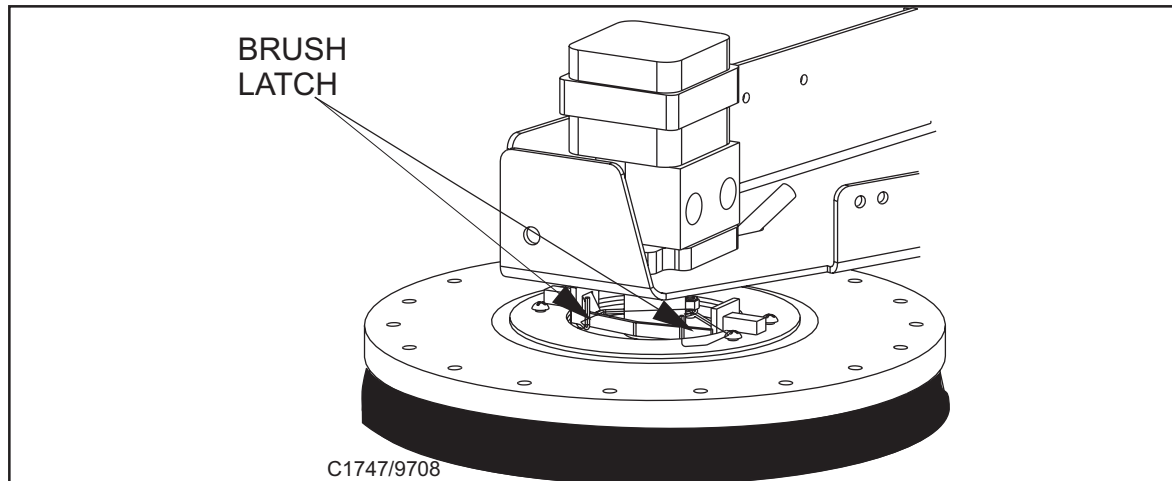
1. Put a drop cloth on the floor.
2. Drive the machine onto the drop cloth.
3. Set the parking brake.
4. Open the seat compartment.
5. Put a container under the reservoir drain to catch the reservoir fluid.
6. Remove the drain plug. The reservoir fluid will drain. Do not use the drained fluid to refill the hydraulic reservoir. Dispose of the used fluid.
7. Flush the interior of the hydraulic reservoir with clean fluid.
8. Put the reservoir plug (removed in Step 6) back in the hydraulic tank drain and tighten it. A pipe thread sealer is required on the plug.
9. Open the breather filter cap.
10. Fill the reservoir with new FORD type "F" automotive transmission fluid. The capacity of the tank is 10 gallons. Fill to the "FULL" line on the hydraulic fluid sight gauge.
11. Close the breather filter cap.
12. Close the seat compartment.



P5091 FIGURE 41

REPLACING THE RETURN FILTER ELEMENT

1. Replace the return filter element after 250 hours of machine run time.
2. Unscrew the fasteners from the filter assembly cover and retain.
3. Remove the cover and the compression spring and retain.
4. Discard the old filter element.
5. Position the new filter element inside the filter body.
6. Put the compression spring in position. Wipe the cover magnet free of any metal filings or debris.
7. Place O-ring (moisten with clean hydraulic fluid) and cover into position.
8. Reattach fasteners to the filter cover.
9. Clean any hydraulic reservoir fluid spills. The fluid can damage painted surfaces on the machine.



C1747

FIGURE 42

REPLACING THE SCRUB BRUSH

1. Raise the scrub brush deck by pressing the “Scrub Brush” switch on the instrument panel.
2. Press the brush latches in to release the scrub brush.
3. Remove the old scrub brush.
4. Snap the new brush into place.

COVERS AND LATCHES

The covers have been designed to allow access, either by hinge or removal, to all areas of the machine. No maintenance is required.

SOLUTION LOW WARNING LIGHT

The solution low warning light will illuminate when the solution tank is low. This part of the level control system requires no maintenance. If the system fails to operate, consult the Electrical Troubleshooting Guide.

RECOVERY HIGH WARNING LIGHT

The recovery high warning will illuminate approximately 5 minutes before loss of vacuum to the recovery tank. This part of the level control system requires no maintenance, except for daily cleaning of the tank level switch. If the system fails to operate, consult the Electrical Troubleshooting Guide.

SOLUTION CONTROL (Non-Recycling or Standard)

The solution control lever controls the amount of solution applied to the scrubbing brushes.

The solution control should shut off completely with the lever in the (front) “off” position. If complete shut off does not occur, the control valve should be adjusted.

SOLUTION CONTROL (Recycling or ESP System)

In the recycling mode, the solution control lever is also used to activate the detergent pump. If the detergent pump fails to operate (engine running) when the solution control lever is moved into the low to high range, first check the circuit by manually activating the switch. If the detergent pump does not operate at this time, a further electrical or mechanical check is required (see Electrical Troubleshooting Guide or Detergent Pump Troubleshooting).

GENERAL MACHINE MAINTENANCE

RECYCLING PUMP ESP SYSTEM

The recycling pump is located under the seat. The pump is electric and except for daily cleaning of the pump intake screens, it requires no regular maintenance.

RECYCLING PUMP STORAGE

Always drain pump for extended storage, especially when freezing temperatures may be encountered.

REAR SQUEEGEE

The squeegee will require service when the inner edges of the blades become round with wear, impairing the wiping action or water pickup. To service the rear squeegee use the following steps:

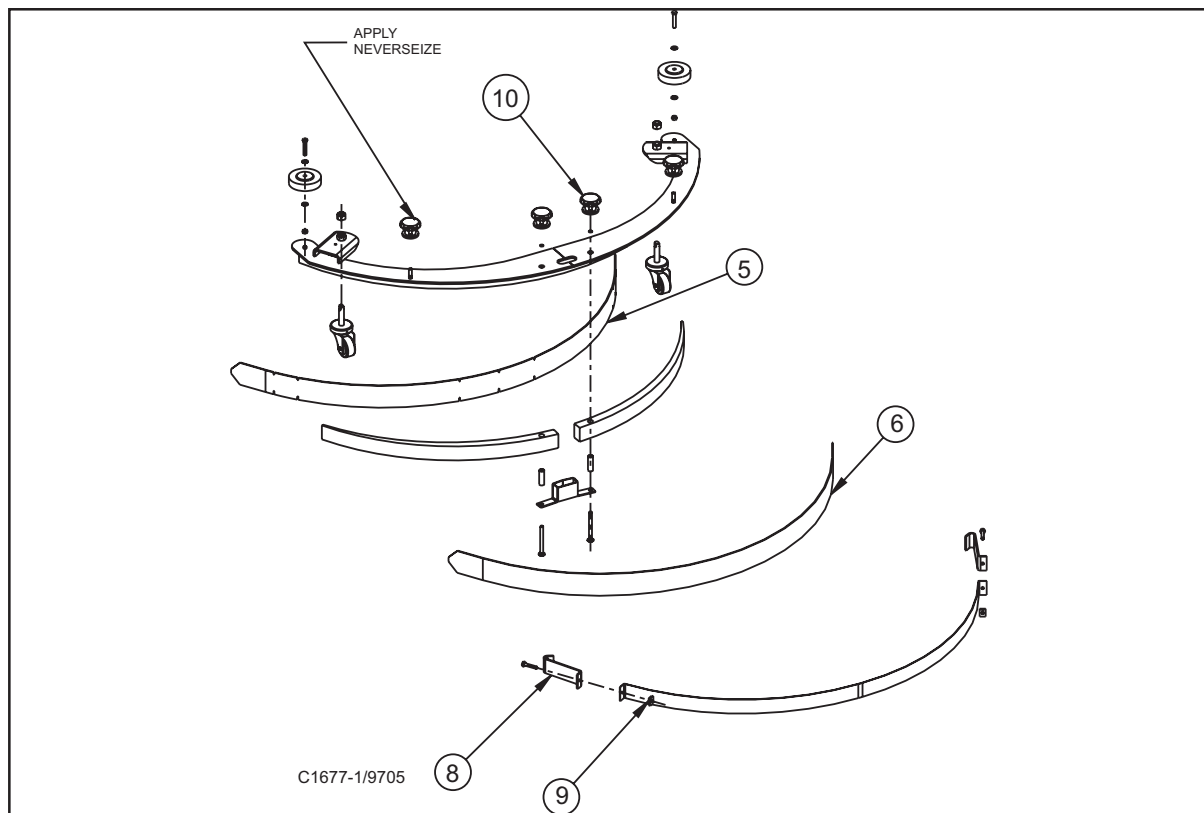
1. Loosen the four aluminum knobs (item 10, these hold the squeegee tool to the squeegee support).
2. Remove the squeegee tool and turn upside down to service the blades or caster wheels. The squeegee blades are designed to flip over and use another unworn edge (items 5 & 6).

To service the blades

1. Loosen the clamp bolts which clamp items 8 & 9 together.
2. Loosen far enough to slip the end clamp brackets off the squeegee tool. This will allow flipping the blades or installing new blades.
3. Install blades so that the outer blade is 3/16" longer than the inner blades. This is achieved by assembling the top edge of the blade against the squeegee tool weldment.
4. Re-install the squeegee clamp band and tighten the clamp bolt.

SQUEEGEE CASTER WHEELS

There are 2 grease fittings on each caster wheel. The casters should be greased each time the blades are serviced.



C1677-1

FIGURE 43

ADJUSTING CASTERS

Lower the squeegee on a flat surface, making sure the rear squeegee blade is perpendicular to the surface. Adjust the caster 3/16" above the flat surface. Lock the jam nuts.

BATTERY

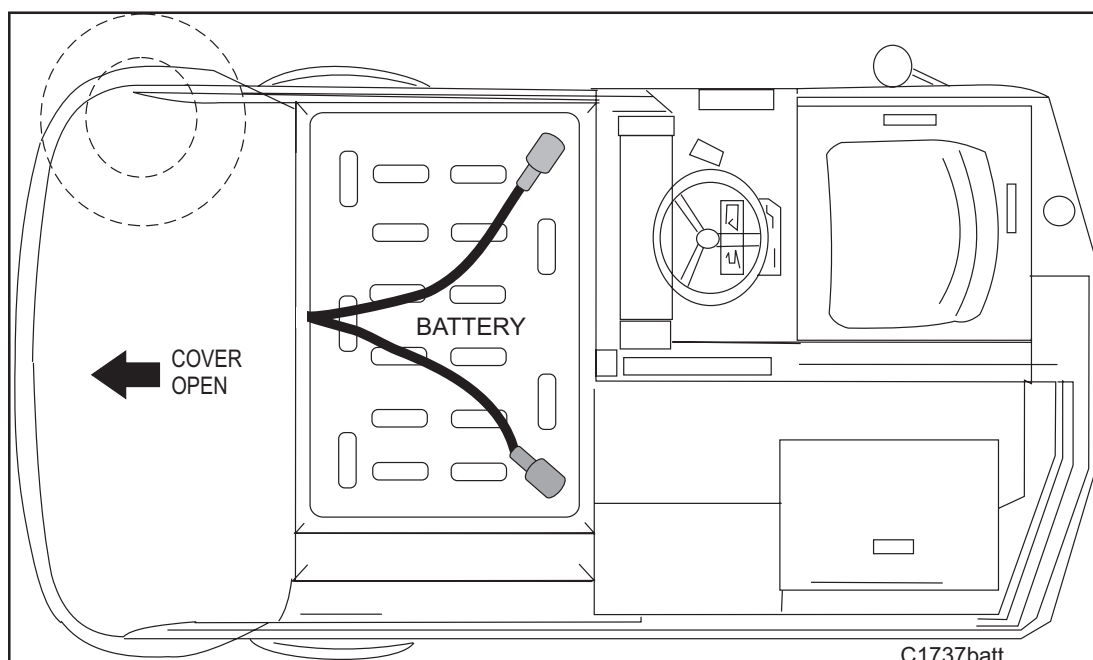
The battery is located in front of the operator's compartment with easy access through the hopper door.

Keep the top of the battery clean and dry. Keep the terminals and connectors clean. To clean the top of the battery, use a damp cloth with a weak solution of ammonia or bicarbonate of soda. To clean the terminals and connectors, use a terminal and connector-cleaning tool.



WARNING

NEVER allow the soda solution to enter the cells.
This will permanently destroy the battery's recharging capabilities.



C1737batt

FIGURE 50

C1737batt

ABBREVIATIONS - SCREWS

ADJ	= Adjusting Screw
ADJ.SP	= Adjusting Plunger Screw
BHM	= Binding Head Machine Screw
BHS	= Button Head Socket Screw
CAPT.SL	= Captivated Slotted Screw
CAPT.WG	= Captivated Wing Screw
FHM	= Flat Head Machine Screw
FIL.HM	= Filister Head Machine Screw
HHC	= Hexagon Head Cap Screw
HHM	= Hexagon Head Machine Screw
HIHD	= 1/2 High Head Screw
HSHC	= Hexagonal Socket Head Cap Screw
HSFHC	= Hexagonal Socket Flat Head Cap Screw
KNH	= Knurled Head Screw
MHHC	= Metric Hexagon Head Cap Screw
PHM	= Pan Head Machine Screw
RHD	= Round Head Drive Screw
RHM	= Round Head Machine Screw
RHW	= Round Head Wood Screw
SHC	= Shiny Crown Cap Screw
SHTB	= Shoulder Thumb Screw
SQ	= Square Head Screw
TB	= Thumb Screw
THM	= Truss Head Machine Screw
WELD	= Weld Stud
WG	= Wing Screw

ABBREVIATIONS - SETSCREWS

HS	= Hexagonal Socket Setscrew
S	= Slotted Setscrew
SH	= Square Head Setscrew
-KCP	= Knurled Cup Point Setscrew
-CP	= Cup Point Setscrew
-OP	= Oval Point Setscrew
-FDP	= Full Dog Point Setscrew
-HDP	= Half Dog Point Setscrew
-FP	= Flat Point Setscrew
-COP	= Cone Point Setscrew

GENERAL TROUBLESHOOTING

<u>PROBLEM</u>	<u>PROBABLE CAUSE</u>	<u>REMEDY</u>
Sweeping Does Not Function.	<ol style="list-style-type: none">1. Dump door open2. Hopper is raised3. Hopper switch out of adjustment	<ol style="list-style-type: none">1. Close dump door.2. Lower hopper3. Adjust hopper switch
Poor Water Pick-Up At Squeegee.	<ol style="list-style-type: none">1. Side or rear squeegee are worn or damaged.2. Clogging in water pick-up.3. Air leaks in suction hose and connection4. Air leaks at recovery tank cover and/or manifold gaskets.5. Poor vacuum6. Drain hose or drain plug leakage or not closed properly.	<ol style="list-style-type: none">1. Examine squeegee rubber blade for cuts or worn spots. Replace if necessary.2. Repair or replace hose and connections.3. Repair or replace gaskets.4. Check vacuum motor.5. Check seal on recovery tank.6. Close, repair or replace drain plug in recovery tank.
Water Spills From Squeegee.	<ol style="list-style-type: none">1. Side squeegee blades, poor contact with floor.2. Squeegee blades worn or damaged.3. Too much solution being applied before making turns.4. Brushes rotating opposite direction.	<ol style="list-style-type: none">1. Readjust blades for proper contact.2. Replace and adjust3. Shut off solution flow 5 to 10 feet.4. Check position of switches
Lack Of Suction At Rear.	<ol style="list-style-type: none">1. Clogged suction hose or pick-up tool.2. Loose connections between suction hose & squeegee or between hoses of manifold inlet.3. Vacuum motor not operating.4. Vacuum float cage clogged.5. Vacuum float shut off	<ol style="list-style-type: none">1. Disconnect suction hose from squeegee, flush squeegee & hoses thoroughly.2. Check all hose connections for looseness or damage.3. Check hydraulic motor in recovery.4. Clean perforated metal thoroughly.5. Excessive solution in recovery drain tank. Excessive foam build up, change cleaning chemical mixture. Use A-L approved materials.

GENERAL TROUBLESHOOTING

<u>PROBLEM</u>	<u>PROBABLE CAUSE</u>	<u>REMEDY</u>
Poor Scrubbing	<ol style="list-style-type: none"> 1. Worn scrubbing brushes 2. Incorrect method of operation 3. Wrong cleaning agent or mixture 4. Poor solution distribution 	<ol style="list-style-type: none"> 1. Inspect brushes. If they are worn to ½" (1.3 cm) or less, replace all 3 brushes 2. Check scrubbing procedures, brush pressure, type of brush solution flow & cleaning chemical used. For extreme conditions double scrubbing may be necessary. 3. Use A-L recommended materials 4. Clean out distribution tube & metering holes to brushes. Check feed hose & clean if necessary. Check valve & cable control system.
Machine Runs, But Will Not Move on Level Ground	<ol style="list-style-type: none"> 1. Foot pedal and/or linkage jammed or not adjusted. 2. Front wheels jammed or brakes locked 3. Hydraulic pump trouble. 4. Rear wheel hydraulic motor, broken shaft key, broken shaft etc. 	<ol style="list-style-type: none"> 1. Check pedal linkage 2. Check wheels & brakes 3. Check & repair pump, check tow valve. 4. Check & repair or replace.
Machine Moves Slowly	<ol style="list-style-type: none"> 1. Low hydraulic oil level 2. Brake dragging 3. Hydraulic oil temperature too high 4. Worn hydraulic pump or drive motor 	<ol style="list-style-type: none"> 1. Add oil to the reservoir 2. Check brakes 3. Check oil level. Add SAE 5 ATF if required 4. Check & repair or replace.
Hydraulic Pump Making Excessive Noise	<ol style="list-style-type: none"> 1. Clogged inlet strainer or suction line 2. Air bubbles in hydraulic fluid 3. Hydraulic pump is worn or damaged 	<ol style="list-style-type: none"> 1. Clean inlet strainer line. Drain & flush reservoir if oil is dirty. Refill with clean SAE 5 ATF. 2. Check for low hydraulic fluid level, leaking fitting or hoses 3. Check & repair or replace.

Parts may be ordered from Alto authorized distributors:

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<http://www.alto-online.com>

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- 2. Give the part number, description, and quantity of parts needed.**
- 3. Give shipping instructions for either freight, UPS, or parcel post.**

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